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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Survey Finds New York DPers Get Biggest Bite of Salary Pie

By Marguerite Zientara
CW Staff

NORTHFIELD, Ill. — The New York City area is home to the highest paid DPers in the country, according to a survey made recently by Source EDP.

The DP recruiting firm's "1982 Local Metropolitan Computer Salary Survey" divides salary data by market, by size of computer systems site and by position. Forty-eight specific categories — including programming, systems design, data communications, mini/micro systems, data base, DP auditing and marketing management — were reviewed in 40 U.S. cities (charts on Page 4).

The only categories in which New York did not come out first were "Engineering/Scientific Programmers & Programmer Analysts," "Mini/Microcomputer Programmers & Programmer Analysts" and "Marketing Representatives." And "Engineering/Scientific" DPers have only to cross the East River to Long Island to earn more than residents of the Big Apple, the survey found.

Programmers and programmer/analysts specializing in mini/micros earn the most in the San Francisco

(Continued on Page 4)

IBM Wooing Users With New Lease Plans

By Tom Henkel
CW Staff

ARMONK, N.Y. — It's simple. IBM wants to be your computer company.

That takeoff on Ford Motor Co.'s latest slogan may not be far from the mark. IBM recently revised its leasing program on several mid-range systems to include two lease options that appear similar to the type of credit services offered by major auto manufacturers.

Under the leasing plan, IBM Credit Corp. has formed a partnership with Merrill Lynch, Pierce, Fenner and Smith, Inc. to offer two extended leasing options available on three-, four- or five-year plans. The leasing options are available to users of IBM System/34, System/38, 4341, 4331, 4321 and 8100 systems, IBM said.

Option A requires both the customer and the equipment to qualify for a government investment tax credit. Option A gives the investment tax credit to the IBM/Merrill Lynch partnership in exchange for a reduction of the customer's lease rate.

Option B allows users who qualify for Option A to keep the investment tax credit but pay a higher monthly lease fee, according to IBM.

In a move analysts feel is an effort to coerce users into using the new options, IBM raised conventional lease and rental rates on the qualifying systems by 8% for both existing and new users. For new users, the increase goes into effect immediately,

(Continued on Page 2)

PE 'Reliance' For Superminis Goes Relational

By Tim Scannell
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp.'s Business Systems Division last week expanded its growing repertoire of 32-bit software by introducing a transaction-oriented online relational data base management system.

Reliance Plus — an outgrowth of the firm's Reliance transaction processing system introduced at this time last year — consists of an integrated group of software components that support transaction processing, data base management, data definition, query and report processing and applications development. It operates under PE's OS/32 operating system, can handle programs written in Ansi 74 Cobol or Ansi 77 Fortran and incorporates PE's nonprocedural relational query language, RQL/32, to produce queries and reports, reportedly without any programming.

Minimum hardware requirements for Reliance Plus are a 32-bit processor with at least 1M byte of memory,

(Continued on Page 6)

Exhibits the Main Attraction

Ninth Siggraph Show Proves Big Draw

By Tim Scannell
CW Staff

BOSTON — It is not often that technology can rival nature, but that is exactly what happened here last week when the Association for Computing Machinery's Special Interest Group on Computer Graphics staged its ninth annual conference on computer graphics and interactive techniques.

Outside, the weather was generally bright and sunny as the five-day show opened its doors to thousands of executives, professionals and computer graphics aficionados. But the weather was the last thing on the minds of those inside Boston's John B. Hynes Veterans Auditorium, where booths filled with graphics terminals, color displays and computer-aided animation stole the spotlight from Mother Nature.

More than 170 vendors — a hefty portion of which are based in New England — displayed their latest technologies and techniques at Siggraph '82. While the show's emphasis was on both education and enlightenment, most attendees were attracted to the exhibits, a fair number of which debuted at the ACM-sponsored event.

(Continued on Page 10)

'Fore!' — by Core

By Jim Bartimo
CW Staff

TULSA, Okla. — Professional golfers who tee off on the opening day of the PGA Championship golf tournament Thursday will have more than stationary bunkers and water hazards to contend with. They'll also be facing a course that will change before their eyes.

Behind the scenes will be tournament officials who will have at their fingertips detailed hole-by-hole scoring information on 150 of the nation's top golfers. As the pros progress around the

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Software Costs Could Rise 20%

Univac Unbundles 1100/90 Support

By Marcia Blumenthal
CW Staff

BLUE BELL, Pa. — Along with the recent announcement of its 1100/90 system [CW, July 19], Sperry Univac further unbundled its software support, which could cost users of that system who require on-site support 20% more for software than users of the firm's older systems.

Until the introduction of the 1100/90, Univac had included on-site service in the regular monthly license fee. The recent move is a further evolution of the company's unbundling strategy, which began only three years ago with the announcement of the 1100/60.

The four new program products announced at the same time as the 1100/90 — Universal Data System 1100 (UDS), Advise, Interactive Processing Facility 1100 and Universal Compiling System 1100 — will carry an Extended Support Service (ESS) charge for on-site service in addition to a basic monthly charge. This basic charge covers the licensing fee and first-level support such as revisions, corrections and bug reports.

However, the ESS fees apply only to users of the 1100/90. Moreover, any other existing software that runs on that system will also carry the ESS tag, according to Richard Wallach, software strategist for Univac's product strategy and management operation.

Users are not required to purchase ESS, but can pay for on-site support on a time and materials basis.

For example, the UDS control software carries a monthly fee of $250, with $50 for ESS; the Data Management System 1100 is priced at $1,200/mo, with a $240/mo ESS charge; and the Advise 1100 end-user query language costs $300/mo, with another $60 for ESS.

The new software products and those that currently run on 1100/60 and 1100/80 processors will not be subject to the ESS fee. The software products introduced with the 1100/90 also run on these older systems.

No Plans for ESS

Contrary to some published reports, Univac has no plans to add ESS charges to the older family of systems, maintained Ron Wandersee, director of software strategy in the company's product and strategy management operation. The price for the second level of support, direct on-site assistance, is already built into the 1100/60 and 1100/80 hardware prices. To institute ESS pricing would require the firm to roll back hardware prices for those older products, Wandersee explained.

Wallach said it is easier to institute a new software pricing policy at the time a new system is introduced. This is because the company does not sell its software and changing all existing contracts to include charges for on-site support may be administratively too complicated.

Although Univac does not currently sell or charge an installation fee for its software, policies on these issues, which could impact maintenance charges, are under discussion at the firm, Wallach said.

IBM Adds Leasing Options

(Continued from Page 1)

and for current users the increase takes effect Nov. 1, IBM said. In addition, IBM announced that effective Nov. 1, the maximum purchase credit accrual rate on the 4331 and 4341 processors will be reduced from 60% to 40%.

Existing users can break their leases and switch to Option B without penalty. There is a penalty to switch to Option A, IBM said.

In addition, the new leasing options apply to the announced processors as well as most significant related peripherals (such as specific terminals, tape and disk drives) provided an order is for at least $100,000.

The plan does not, however, apply to devices not directly associated with the mid-range processors eligible under the plan.

Different Leases

The lease options offered through the IBM Credit Corp. differ from traditional IBM leases in several ways. Both Option A and B are noncancelable and are offered at fixed interest rates for the term of the lease. Traditional IBM leases are offered at a flexible interest rate and are cancelable, IBM said.

Under the new lease options, IBM Credit Corp. buys a user's system from IBM (the computer company). IBM records the transaction as a system purchase and the Credit Corp. holds title to the system.

Users who choose Option A cannot purchase their systems until the lease term expires. Option B users can purchase their systems at an earlier time, IBM said.

Four Choices

At the end of the lease term, users are faced with four choices. They can:

- Renew the lease on a one-year basis at current market rates.
- Renew on a less than one year basis.
- Buy the processor.
- Return the processor.

IBM said if the user with Option A chooses to purchase the processor, the purchase price will be determined by the current market value of the hardware when the term of the lease expires.

Option B users, however, can agree on a purchase price at the inception of the lease agreement if they so choose.

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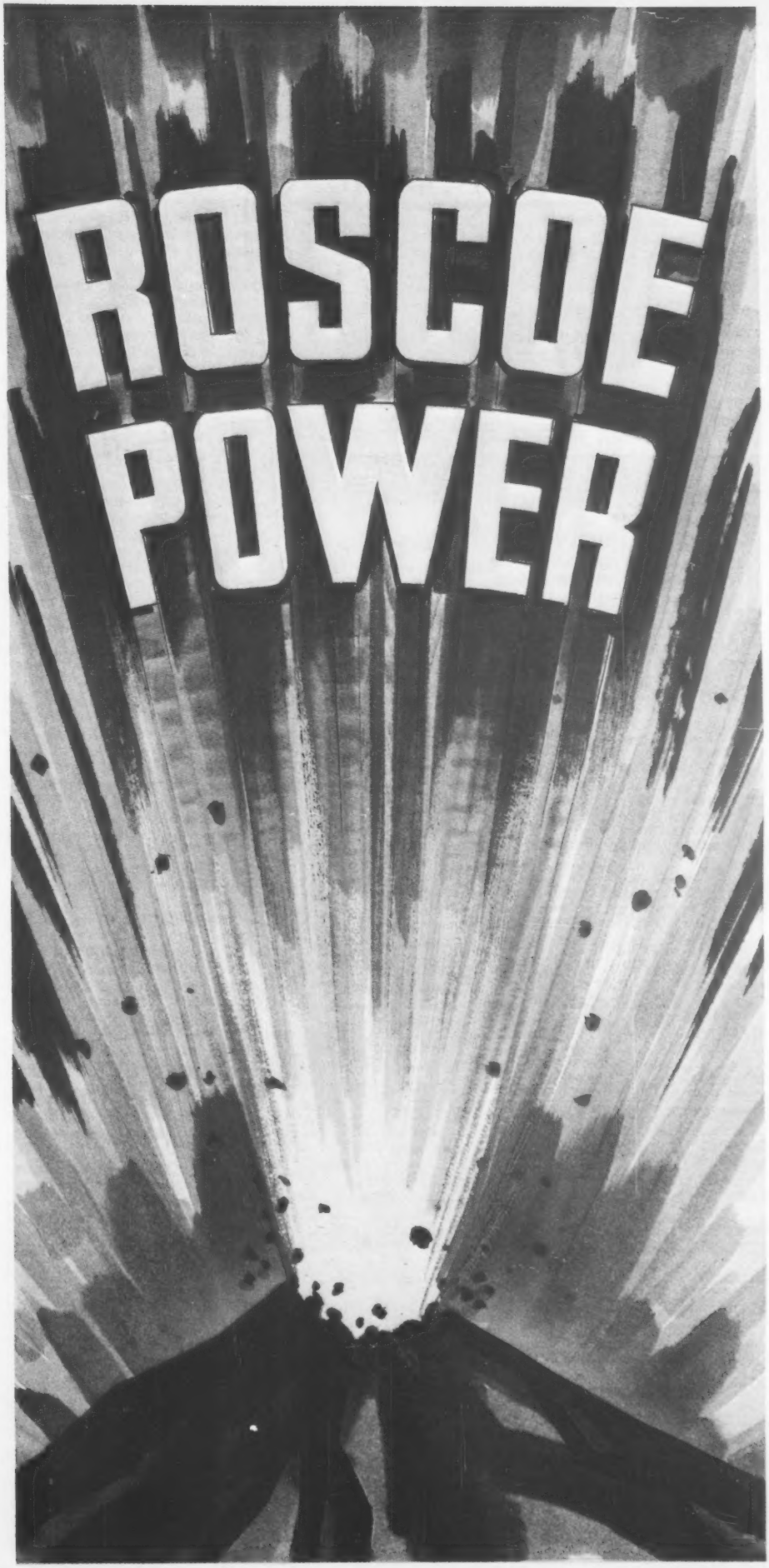
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ADR's ROSCOE®. Dramatically enhanced to meet the challenge of the 80's.

Version 5 of ROSCOE, ADR's online program development system, has been released to over 1,000 OS/VS installations. Virtually every aspect, both internal and external, has been re-engineered to meet the stringent needs of the 80's.

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ADR's all-new ROSCOE also supports dataset and catalog management, provides unparalleled security and integrity facilities, and accounts for system usage with remarkable accuracy. ROSCOE's Programming Facility (RPF) supplies quick interactive solutions to programmer and end user problems, while ROSCOE with The LIBRARIAN® offers unequalled auditing capabilities. ROSCOE Version 5's internal enhancements include shorter dispatching path lengths, completely reentrant code, and stack architecture.

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New York DPers Get Biggest Bite of Salary Pie

MANAGEMENT POSITIONS	HIGH ($000)	LOW ($000)	NORTH AMERICAN MEDIAN ($000)
Technical Services Managers			
Small	38.9 Los Angeles	30.1 Albuquerque	37.0
Medium	44.5 New York City	33.7 Albuquerque	41.1
Large	52.6 New York City	40.0 Albuquerque	46.1
Systems & Programming Managers			
Small	39.0 New York City	29.9 Albuquerque	35.4
Medium	48.1 New York City	35.0 Albuquerque	41.5
Large	54.1 New York City	39.1 Albuquerque	46.7
Operations Managers			
Small	30.0 New York City	22.4 New Hampshire	26.9
Medium	37.7 New York City	25.6 New Hampshire	30.7
Large	48.5 New York City	32.1 New Hampshire	38.6
Information Systems Directors			
Small	46.5 New York City	31.4 Albuquerque	40.5
Medium	60.0 New York City	39.8 Albuquerque	47.0
Large	77.0 New York City	46.7 Miami	56.9

Source: Source EDP

NON MANAGEMENT POSITIONS	HIGH ($000)	LOW ($000)	NORTH AMERICAN MEDIAN ($000)
Commercial Programmers & Programmer Analysts			
6 Months — 1 Year	20.4 Los Angeles	16.4 Albuquerque	19.2
1 Year — 2 Years	23.9 New York City	18.2 Albuquerque	21.6
2 Years — 4 Years	29.0 New York City	21.9 Albuquerque	25.2
Over 4 Years	35.7 New York City	25.8 Columbus	29.8
Engineering/Scientific Programmers & Programmer Analysts			
6 Months — 1 Year	21.8 Long Island	17.8 Indianapolis	20.1
1 Year — 2 Years	25.5 Long Island	20.0 Phoenix	22.0
2 Years — 4 Years	29.3 Los Angeles	23.5 Indianapolis	26.2
Over 4 Years	37.5 Long Island	27.2 Portland, Ore.	32.0
Mini/Microcomputer Programmers & Programmer Analysts			
6 Months — 1 Year	22.7 San Francisco/ Bay Area	16.8 Columbus	19.7
1 Year — 2 Years	26.4 San Francisco/ Bay Area	19.7 Columbus	22.9
2 Years — 4 Years	32.9 San Francisco/ Bay Area	23.6 Columbus	26.6
Over 4 Years	37.4 Upper Fairfield Cty./ New Haven, Conn.	28.3 Columbus	32.8
Systems (Software) Programmers			
1 Year — 2 Years	28.5 New York City	21.7 Albuquerque	25.8
2 Years — 4 Years	34.2 Boston	Columbus & 26.3 Albuquerque	29.3
Over 4 Years	41.1 New York City	31.6 Albuquerque	36.1
Data Base Specialists			
1 Year — 2 Years	29.5 New York City & Los Angeles	23.4 Phoenix	26.8
2 Years — 4 Years	35.5 New York City	27.6 Albuquerque	31.3
Over 4 Years	44.7 San Francisco/ Bay Area	32.1 Albuquerque	38.5
Data Communications Programmers & Programmer Analysts			
1 Year — 2 Years	28.0 New York City	22.8 Phoenix	25.3
2 Years — 4 Years	34.7 New York City	26.9 Albuquerque	30.6
Over 4 Years	41.8 New York City	31.7 Albuquerque	36.2
Documentation Specialists			
6 Months — 1 Year	21.6 Boston	16.0 Pittsburgh	20.1
1 Year — 2 Years	24.3 New York City	18.2 Columbus	22.5
2 Years — 4 Years	29.2 New York City	22.1 Albuquerque	25.3
Over 4 Years	32.4 New York City	24.6 Albuquerque	28.6
EDP Auditors			
1 Year — 2 Years	28.0 New York City	20.1 New Hampshire	23.8
2 Years — 4 Years	34.3 New York City	24.6 New Hampshire	28.1
Over 4 Years	44.0 New York City	Baltimore & 30.5 Miami	36.0
Senior Analysts, Project Leaders & Consultants			
2 Years — 4 Years	32.3 Boston	24.8 Albuquerque	29.1
4 Years — 6 Years	37.5 New York City	26.9 Albuquerque	32.3
Over 6 Years	45.0 New York City	31.0 Columbus	36.9

Source: Source EDP

MARKETING POSITIONS	HIGH ($000)	LOW ($000)	NORTH AMERICAN MEDIAN ($000)
Marketing Representatives	51.5 Washington, D.C.	36.1 Albuquerque	41.5
Marketing Managers	64.7 New York City	49.0 Albuquerque	56.5
Marketing Technical Support Representatives			
1 Year — 2 Years	26.3 Washington, D.C.	19.2 Louisville	22.9
2 Years — 4 Years	31.5 New York City	24.8 Columbus	28.1
Over 4 Years	40.2 New York City	29.1 Baltimore	33.8

Source: Source EDP

(Continued from Page 1)

Bay Area, while marketing representatives earn the most in Washington, D.C., according to the survey, which was based on "a city-by-city analysis of thousands of hiring organizations and computer professionals that Source EDP has assisted," the report said.

Conversely, Albuquerque, N.M., is the city with the largest number of rock-bottom salaries — in 24 out of the 48 positions.

Mini/microcomputer programmers and analysts earn the least in Columbus, Ohio, and operations managers take home the leanest paychecks in New Hampshire (treated as a metropolitan area), according to Source EDP.

Three Categories

Source EDP placed the job positions into three main categories: nonmanagement, management and marketing. While salaries for nonmanagement positions usually depend on length of professional experience, according to the study, management salaries depend on the size of the computer system installed or on order.

Installation size was defined in terms of IBM 370 or equivalent models as follows: small — smaller than 370/125 or System/34; medium — 370/125 or System/34 to 370/145 or 4341; large — 370/158, 3031 or larger.

The largest average salary ($77,000) is earned by information systems directors in large installations in New York City, while documentation specialists in Pittsburgh, Pa., with six months' to one year's experience take home the smallest average paychecks ($16,000), according to the Source EDP survey.

Figures for all position categories were also given for the Canadian cities of Edmonton/Calgary, Montreal, Toronto and Vancouver, in Canadian dollars. The survey is available free to computer professionals from Source EDP, Suite 227, Department DX-14, Two Northfield Plaza, Northfield, Ill. 60093.

Plug Releases Officer Slate

SAN FRANCISCO — Plug, a users group organized to promote the use of IBM-compatible computer equipment, has announced its first slate of officers.

Ed Dugan, vice-president of the Federal Reserve Bank of San Francisco, has been nominated president-designate.

Other officers-designate include Jim White, president of Reliability Research, Inc. in Salisbury, Vt.; Jerry Wilson, senior vice-president of Blue Cross, Rochester, N.Y.; Charles Collier, senior principal consultant of Systems and Computer Technology in Phoenix; and David A. Moskovitz of Walker Interactive Products, San Francisco.

More information on Plug is available from Duane Tucker at Suite 8, 126 W. 25th Ave., San Mateo, Calif. 94403.

DPPX Users Get 'DOSF' Access

RYE, N.Y. — In addition to its latest release of DPCX, IBM last week announced that users of the Data Processing Programming Executive (DPPX) operating system can access the Distributed Office Support Facility (DOSF) on an attached processor running under the DPCX operating system.

DPPX users can enter, edit and review the functional capabilities of DOSF by using an IBM 8775 terminal; however, the 8775 still retains its ability to access DPPX applications, IBM said.

The DPPX system is attached either directly or through a nonswitched line to a Synchronous Data Link Control adapter on the DPCX system. Up to eight 8775 displays can be addressed through each DPPX communications port connected to the DPCX/DOSF system. Multiple communications ports are supported based on individual configurations and performance considerations, IBM said.

That facility, also a no-charge item, will be available next April.

For $900 a month, 8100 users can get a new program, a Distributed Processing Connection Facility, which enables a terminal operator at a DPPX processor running DPPX to access multiple 8100, 4300, 30 series and 370 processors in a network. Each system appears to the user as though he were logged on to the remote system. The user may move from session to session and from one system to another without logging on and off. The program will be available in July 1983, IBM said.

Finally, in another no-charge enhancement, IBM added some "help" tutorials and ease-of-use features to its DPPX Interactive Productivity Facility. Those enhancements will be available in September, IBM said.

MV/6000 Gains Memory Boost

WESTBORO, Mass. — Data General Corp. has doubled the maximum main memory on its MV/6000 line of processors from 2M to 4M bytes.

The company also announced that it is switching from 16K- to 64K-bit memory chips in both its MV/6000 and MV/8000 processors. As a result, a DG spokesman said, memory prices have been cut by as much as 68% on the MV/6000 line and up to 44% on the larger MV/8000 line. And because of the reduction in memory prices, purchase prices for the MV/6000 and MV/8000 have been cut by as much as 26% and 10%, respectively, he added.

On new MV/6000 processors, a 1M-byte memory enhancement made up of a 1M-byte board with 64K-bit chips costs $9,000. A 2M-byte memory board costs $16,000.

DG will continue to offer memory enhancements based on 16K-bit chips for users of installed MV/6000 processors. A 1M-byte memory enhancement using 16K-bit chips costs $28,000.

Tied to Displaywriter, Series/1, 5280

IBM 8100 Communications Extended

By Tom Henkel
CW Staff

RYE, N.Y. — IBM last week expanded the field of devices that can be attached to its 8100 line of processors.

The firm also announced Release 3 of the Data Processing Control Executive (DPCX) operating system, adding support for the high-end 8140 Model C processor.

The 8100 can now communicate with IBM's Displaywriter word processing system, Series/1 processors, 5280 distributed data systems and the 3640 plant communications system. The terminals supported by these systems appear to the 8100 as if they were 3270 CRT terminals.

Calling the communications feature "data stream compatibility," IBM said users of the supported devices can now communicate with data bases stored in large IBM host processors, including 370, 30 and 4300 series processors.

The 8100 communications capability for the Series/1 is available immediately at no additional charge for current users of DPCX Release 2.2; the others will be available in September.

DPCX Release 3

Release 3 of DPCX doubles the number of terminals that can be attached to an 8140 Model C processor and promises a throughput improvement of 60% compared with an 8140 Model B processor. Under the new release, the 8140 Model C can handle up to 62 concurrent user tasks, doubling the earlier limit of 31 concurrent tasks. This modification allows a maximum of 62 terminals to be tied to the Model C.

The same enhancement was announced as a no-charge option for Release 2.2 of DPCX.

The new release also allows users to attach Displaywriters to 8100 Model C systems via a 3270 emulation feature. Furthermore, Model C users now have support for up to 2M bytes of processor storage and 4M bytes of local storage, IBM said.

DPCX Release 3 costs $394/mo and will be available next April.

DEVELOPING TODAY'S SYSTEMS ASKS A LOT FROM TODAY'S USER.

For years, systems requirements were defined *for* users by analysts who were computer professionals. Although this *seemed* to work, many an unfamiliar system was imposed on an unwilling user. The resulting disasters led many organizations to create project teams where analysts got together *with* the users to define the requirements of the system. This worked so well that requirements definition today is a skill that is expected of every user.

Today's user is expected to (1.) Review the requirements definitions produced by an analysis team (2.) Participate effectively as a member of an analysis team and ultimately (3.) Lead an analysis team. In effect, the user has become an analyst.

Obviously, users need training to meet these new demands. They need a set of tools and techniques to translate their knowledge of a system into a product the implementers can use. Now, YOURDON has a dynamic three-day course oriented to the special needs of the user. "Structured Analysis for Users" covers the following topics. (1.) What is a system? (2.) Overview of Structured Analysis. (3.) Data Flow Diagrams. (4.) The Data Dictionary. (5.) Mini-Specifications. (6.) Determination of system context. (7.) The current physical model. (8.) The logical model. (9.) New requirements. (10.) The new implementation. (11.) Tools, techniques and strategy review.

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Warrants Issued for Nine Hitachi Employees

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — Warrants have been issued for the arrest of nine of the Hitachi Ltd. employees who were recently indicted for conspiring to steal IBM trade secrets and transport them to Japan [CW, June 28].

Whether the warrants will ultimately lead to the suspects' arrests remains to be seen. All nine of the Hitachi employees live in Japan, where Ministry of Justice officials are still weighing a U.S. government effort to have the defendants extradited.

The warrants were issued by U.S. magistrate Nordin Blacker on July 22, the same day the suspects were supposed to appear in federal court here to respond to charges that they participated in the IBM trade-secrets theft scheme. None of the nine Hitachi employees appeared in court as ordered.

In a related development, an employee of Tokyo-based Mitsubishi Electric Corp. pleaded guilty to the charges filed against him in the IBM case. Takaya Ishida, who works as an engineer in Mitsubishi's Computer Planning Group, was indicted July 19 for conspiring to transport stolen IBM property from the U.S. to Japan. Three days later, he entered his plea in U.S. district court.

Ishida's action makes him the first suspect in the industrial espionage scandal to plead guilty. Since it first came to light on June 22, the case has resulted in indictments against 21 individuals and two companies, Hitachi and Mitsubishi.

In addition to Ishida, the indicted individuals include 12 businessmen who still live in Japan and thus lie beyond the reach of U. S. law, at least temporarily. Nine of those suspects work for Hitachi and the balance for Mitsubishi.

The nine Hitachi employees are the same individuals for whom arrest warrants were issued on July 22. Kisaburo Nakazawa, the highest ranking of the alleged Japanese conspirators, holds the title of general manager for Hitachi's Kanagawa Works, the company's CPU-manufacturing arm.

Takehiro Inoue, Katsuhiko Kato and Sadao Kawano work as department managers, while Michihiro Hirai, Jun Naruse, Katsuro Wakai and Teruji Yamamoto are senior engineers. Katsumi Takeda, meanwhile, was formerly employed as an engineer with Hitachi's U.S. subsidiary, Hitachi America Ltd.

The 21 indicted suspects also include eight U.S. residents who pleaded innocent to the charges against them on July 1.

PE Adds Relational DBMS to 'Reliance'

(Continued from Page 1)

an 80M-byte disk drive and PE's editing CRT terminals. Version 6.1 or higher of OS/32 operating system is also required.

PE designed the DBMS to compete primarily with a similar system offered by Tandem Computers, Inc., which reportedly does not include a data dictionary, and with data management packages offered by Digital Equipment Corp., Hewlett-Packard Co. and Prime Computer, Inc., according to Susan Hoffberg, a PE senior product manager.

Target users of the DBMS include system developers, OEMs, software houses and end users. Hoffberg said PE expects to ship "way over a hundred units" during the next fiscal year, which will soon begin.

The chief benefit of the software system is that all its components are integrated, Hoffberg maintained. The system is geared to present data relationally to an applications programmer or query user, with data organized in an inverted file structure, and to manage concurrent access and update of the application data base, Hoffberg noted.

Transaction Processing

The system's transaction processing feature is a performance-oriented, multithreaded device that provides menus and screens to build a data base. In fact, this particular component presents a "fill-in-the-blank" construction format for users who have no prior programming experience. Each created field in the user's screen can include associated validation attributes that restrict the type of data to be entered. When the application is launched, user-entered data is compared with these attributes. If things do not match up, an error signal occurs and the application program does not load, Hoffberg explained.

Screen forms also include facilities for Help and Sample Application, which are designed to "walk" a user through programming sequences.

Basic security for the system is provided by a user identifier and password system. However, that security can be enhanced to include passwords associated with individual terminals and terminal locations.

Data manipulation within the system is handled via Cobol and Fortan subprogram calls or Cobol indexed I/O statements that are included in the application programs. The DBMS supports facilities for data definition, data base access, concurrency control, data integrity, program independence, access security, data base design, data base maintenance recovery and query/report processing, Hoffberg pointed out.

Data Dictionary

Reliance Plus' data dictionary provides the data description language (DDL), which reportedly allows the user to define and control the use of data throughout the application environment. Access to the data dictionary is transaction oriented and also relies on the fill-in-the-blanks screen format. All data, including file definitions, file types and data views are defined using the data dictionary.

Reliance Plus can handle up to 128 terminals or remote editing stations within each applications environment. The system supports leased or switched lines in point-to-point or multidrop configurations. Communications among systems is accomplished via the X.25 packet-switching network standard or through the IBM 3270 bisynchronous protocol.

Reliance Plus costs $24,500. However, current users of Reliance can upgrade to a complete DBMS for $8,000. The initial license includes a year of free maintenance.

Shipments of the DBMS are scheduled to begin immediately from the firm at 2 Crescent Place, Oceanport, N.J. 07757.


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PGA to Place Flags by Computer

(Continued from Page 1)

course, officials will use this computer-generated scorecard to decide whether the course is too easy or too difficult and whether the course should be changed accordingly.

Players' scores will be tabulated this year by an IBM 4341 mainframe running under DOS/VSE, CICS software and a CICS productivity aid from Oxford Software Corp. called User Files On-Line (UFO), according to Verne Sheidler of Oxford Software. The use of the equipment and the development time for the software was donated by the DP department of Braden Steel Corp., DP Manager Jack Silver said.

The CICS programming, even with the programming aid, took programmer/analyst Alan Engel three months to complete, Silver said.

The equipment will allow officials to determine the scores by hole, by round, by player or any combination of the three. "The system will allow the PGA to call up the score for any hole for any particular day," Sheidler said.

In order to change the course for each round, course officials will move the hole to different locations on the putting green by changing the location of the flag.

The DP configuration will also speed the scoring process to the benefit of spectators and players in competition, Sheidler said. Officials will relay the scores vocally over phone lines from the holes to the press tent, where they will be processed and displayed on the "leader boards" on the course.

Seven Telex Computer Products, Inc. Model 279 terminals, which are IBM plug-compatible, will be set up in the press tent area with two Telex 276 control units and two 87D printers.

"We're running two 9,600 bit/sec dedicated telephone lines from the country club to Braden," Silver said. "We went with South Western Bell's Digital Data Service because Bell guarantees a low error rate."

The tournament calls for 72 holes of golf to be played; a minimum purse of $450,000 will go to the winner.

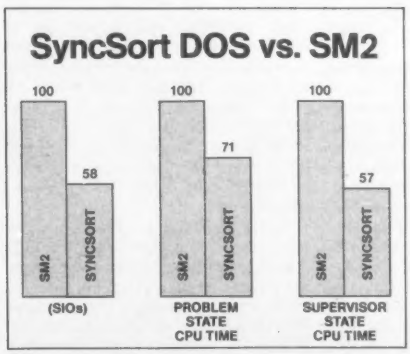
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But the best way to find out what SyncSort DOS can do for you and yours is to try it. Just give us a call and we'll send our young prodigy over. But we warn you it's going to sweep your 4300 right off its tracks!

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A 32-Bit Processor Puts Apollo Into Graphics

By Tim Scannell
CW Staff

BOSTON — As thousands of people jammed into a nearby auditorium to attend the Association for Computing Machinery's (ACM) Siggraph '82 graphics show, Apollo Computer, Inc. made its move into the booming graphics industry by unveiling a high-performance, 32-bit distributed graphics processor.

At the same time, the year-and-a-half-old firm announced support for the ACM's Siggraph Core graphics software package — a set of about 160 subroutines — and said that Integrated Software Systems Corp. (Issco) will convert its popular Dissplа and Tell-A-Graf graphics packages for use on Apollo's Domain distributed processing systems.

The DN 600 is a high-performance, high-resolution color computational "node" that lets users create and control graphics representations and dynamically reconfigure up to 2M bytes of dedicated dual-ported display memory, Apollo said. The system is built around a 32-bit central processor that reportedly has the processing power of Digital Equipment Corp.'s VAX-11/750 superminicomputer, according to Barry Fidelman, a marketing stategist with the Chelmsford, Mass.-based company.

The 32-bit unit's central processor has a main memory capacity of up to 3.5M bytes and can be integrated into Apollo's Domain distributed processing network.

Key features of the DN 600 system include:

- A dedicated 16-bit display processor with up to 2M bytes of memory.
- 16M bytes of virtual address space per process and up to 15 processes per user.
- Pipelined data paths for high-speed bit-map manipulations.
- Area fills that operate at speeds up to 320M bit/sec.
- Full-color vectors that can be drawn at more than 1M pixel/sec.

Perhaps the most visually exciting feature of the system is its ability to move entire blocks of data around a screen at rates up to 160M bit/sec. Called "bit-block transfers," this feature is not availale on any other graphics system, an Apollo spokesman claimed.

Using the bit-block movement feature, an entire screen can reportedly be modified in under 1/30 of a second. The effect, when dealing with a full screen of graphics, can be compared to switching from camera to camera at a television studio, Dr. David Nelson, vice-president for systems development at Apollo, said.

Another Apollo employee, J. Michael Greata, described the effect as similar to randomly moving the blocks of a multisegmented wooden puzzle within a square.

The system's 19-in. display has a resolution of 1,024 by 1,024 pixels — or about four times greater than that of a standard television screen. It can also reportedly display up to 250,000 different colors from a palette of 16 million shades and hues, Nelson explained.

The DN 600 has seven operational modes, which are said to allow the user to elect for higher interactive speeds or greater resolution and imaging. It is fully software compatible with the Domain systems family and can accommodate an optional floating-point unit with cache memory.

The entire system costs about $60,000 and is scheduled to be shipped this September.

Topping off its graphics announcement, Apollo revealed that Issco's Dissplа and Tell-A-Graf software has been redesigned to function on the Domain systems and their Aegis operating system. Dissplа is a high-performance programmer's graphics tool while Tell-A-Graf is an English language system designed for end users.

The graphics software is available under the firm's third-party software program, Edward J. Zander, Apollo's marketing director, stated. Issco is a 12-year-old firm with more than 1,000 software installations. Its packages currently run on computers offered by such firms as Control Data Corp., Honeywell, Inc., DEC and Sperry Univac.

Apollo is located at 19 Alpha Road, Chelmsford, Mass. 01824.

Apollo Joins DBMS Race With Distributed System

By Tim Scannell
CW Staff

BOSTON — Apollo Computer, Inc. vaulted into the fast-paced data base race last week when it introduced a distributed data base management system (DBMS) that reportedly boasts relational update and query capabilities.

The Domain Distributed Data Management (D3M) system, introduced during Siggraph '82 here, is a Codasyl-compliant DBMS that is said to let users access data from anywhere in a Domain network made up of 32-bit processors. Smaller individual data bases can be combined into a single aggregate logical data base.

D3M reportedly runs on any Apollo computational node and requires 1M byte of main memory. One node in the Domain network must have a Winchester disk and a diskette.

D3M differs from traditional DBMS because it was designed for engineering, scientific and computer-aided design and manufacturing applications, an Apollo spokesman said.

Like most other DBMS packages, D3M consists of integrated components, each designed as a tool to compile and organize data, including:

- Dataview, which provides relational capabilities for both queries and updates.
- Describe, which allows a user to design a data base using forms or commands.
- Unite, an aggregate schema compiler that allows users to create combinations of data bases throughout the computer's network.
- Formatter, a report-writing package for nonprogrammers.

While typical business-oriented DBMS packages are written in Cobol or PL/I, D3M is structured in Fortran and Pascal — scientific and engineering languages, the Apollo spokesman noted. In addition, the system's schema is defined under the Codasyl format, which provides for an overall logical plan for the structure of the data base, he said.

Each schema is also segmented by a number of subschema that allow users to take individual peaks at certain sections of the data base.

The license fee for D3M is $2,500 per node, including installation, documentation and training. Quantity discounts are available, and subsequent software updates are available for an additional $25 per month.

Initial shipments are scheduled to begin this month, with volume shipments slated for September.

Apollo is based at 19 Alpha Road, Chelmsford, Mass. 01824.

Apollo Adds Winnie Disk, C Compiler

BOSTON — Rounding out its mid-afternoon briefing, held at a hotel not far from Siggraph '82, Apollo Computer, Inc. unveiled an expanded-capacity Winchester disk drive and a C language compiler.

An IBM Hasp capability was also announced by the firm.

The 158M-byte Winchester disk drive complements the 34M- and 68M-byte capacity disks already offered by Apollo. Like these disks, the new model fits into the cabinet of Apollo's Domain system node. Up to two 300M-byte storage module disk drives can also be attached to each node, a spokesman said.

Support of the C language was intended to open up a new realm of software for Domain users. Included in this software are programs written for Bell Laboratories' Unix.

The C compiler is said to be a standard implementation of the program development language operating on all Domain computational nodes. It is supported by Apollo's Aegis operating system.

Finally, by adopting IBM's Hasp capability, the firm has opened another communications gateway to other computer systems. Hasp permits users to move existing programs and files between an Apollo network and an existing mainframe computer and to submit batch jobs to the mainframe for processing.

The higher capacity Winchester disk drive costs $16,800. The C language compiler is priced at $1,250/node, while Hasp is available at no charge as part of Aegis.

The disk system and Hasp are available immediately. The C compiler will be available next month from Apollo, 19 Alpha Road, Chelmsford, Mass. 01824.

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Q SOLUTIONS, INC.

Hardware/Firmware Mix Debuts for Solid Modeling

BOSTON — Lexidata Corp. has introduced a hardware/firmware graphics system for solid modeling that it claimed reduces from minutes to seconds the average time it takes to display a solid image. Called Solidview, the system was announced during Siggraph '82 here last week.

Also introduced by the company was the Model 2410, an addition to its 2000 line of intelligent graphics terminals.

Solidview can display the construction of a solid object incrementally without sequentially repainting the entire screen in scan-line order. Parts of the solid image can be displayed transparently to reveal underlying components, Lexidata Marketing Manager David A. Luther said.

"In this new approach," Luther explained, "hidden surface removal, visible surface shading and pixel drawing functions are performed locally by Solidview, drastically reducing host computer use."

The system processes three-dimensional primitives such as polygons, lines and points as well as two-dimensional data, it was reported. It can also perform piercing and contouring functions and features both constant and smooth shading techniques.

Among the applications for which Lexidata expects the system to be used are mechanical design, architecture, graphics arts, technical illustration and mapping.

The price for a 640 by 512 dot resolution system is $29,000 including monitor. An expanded version incorporating pan/zoom and interactive features is priced at $37,000 including monitor.

The newly introduced Model 2410 is a raster terminal said to provide 1,280 by 1,024 resolution with a refresh rate of 30 Hz interlaced. It is targeted for the sophisticated graphics user in the fields of computer-aided engineering, analysis and design, graphics arts and business graphics.

The terminal incorporates resident software with a Motorola Inc. MC68000 microprocessor equipped with a large memory address range for optimizing speed and handling user programming, it was reported. It can display up to 16 colors simultaneously from a palette of 4,096 colors. The screen can be divided into as many as four workspaces at once. Workspace No. 1 is capable of pan and zoom and interactive display functions, workspace No. 2 is for graphics and text message, workspace No. 3 for vertical scrolling and wraparound for text communications

CW At Siggraph

and workspace No. 4 is for graphics function key menu or message area, a spokesman said.

The price for the Model 2410 ranges from $15,495 for a two-plane system to $18,745 for a four-plane system.

Lexidata is based at 755 Middlesex Tnpk., Billerica, Mass. 01865.



Lexidata's Model 2410

Babcock to Chair ASM Conference

BOSTON — Scott A. Babcock, director of claim systems at John Hancock Life Insurance Co., has been named chairman of the 1983 Annual Conference of the Association for Systems Management (ASM), which will be held here April 24-27.

The ASM event consists of educational programs on systems, data processing and general management.

Babcock will direct a committee of 20 local workers from ASM Chapters in the Boston area, who will host some 1,200 registrants from the U.S. and abroad.

Do you have some questions about VSAM file handling in COBOL? Then here's the book for you...

Just published: VSAM for the COBOL Programmer

If you have to work with VSAM files and you're unsure of what you need to know about them, then you should get a copy of *VSAM for the COBOL Programmer*. Just as its title implies, this practical, how-to guide will teach you all the basics of handling VSAM files in COBOL.

The first chapter is an introduction to VSAM. It talks about VSAM's advantages ...and drawbacks...and introduces you to the common terms you'll need to know before you can continue.

Chapters 2 and 3 are the meat of the book because they cover VSAM key-sequenced files. Key-sequenced files are equivalent to ISAM files on a non-VSAM system, and they make up about 95% of all VSAM files.

Chapter 2, then, explains the COBOL elements you need to know for key-sequenced files. And it gives in-depth coverage to handling the errors that can occur when an I/O statement is executed for a VSAM file. In addition, it tells you how to code the OS JCL you need for COBOL programs that use VSAM files... and why the JCL is so much simpler than it is for ISAM files.

Chapter 3 covers IDCAMS, the Access-Methods-Services program. This is the utility program you must use to set up disk space for a VSAM file before you can even create the file in a COBOL program. In addition to learning how to set up file space, you'll learn how to use IDCAMS to: copy, print, and rename VSAM files; load a VSAM file from a non-VSAM file; and list and maintain a VSAM catalog.

Once you've mastered the material in chapters 2 and 3, you can quickly go through chapters 4 and 5. They cover the COBOL, JCL, and IDCAMS considerations for entry-sequenced and relative-record VSAM files. These are equivalent to sequential and relative files on non-VSAM systems.

Throughout chapters 2-5, the learning is geared toward the OS user. In fact, chapter 5 is for the OS user alone, since DOS VSAM doesn't support relative-record files.

But chapter 6 is devoted to the DOS user. It presents all the variations you need to know about if you're working on a DOS system. So here, you'll learn how the COBOL code, the JCL, and the IDCAMS statements differ from OS. And I think you'll be surprised at how few differences there are.

In short, then, by the end of the book you'll have a thorough grasp of what you need to know to write COBOL programs for VSAM files.

2 reasons why this book is effective

1. The author of this book, Doug Lowe, selected the content based on an analysis of what a COBOL programmer needs to know about VSAM. That means this book contains everything of use to the average COBOL programmer and very little that isn't. It also means you can learn significant VSAM skills...and find the answers to your VSAM questions...in a minimum of time.

2. Perhaps the most important feature of this book is that it contains plenty of examples, so you always see just what the author is talking about. Examples like:

- COBOL listings for file-creation, update, and print programs
- summaries of the codes that can occur in the FILE STATUS field after an I/O statement has been executed...along with recommendations on what action to take when an I/O error occurs
- DOS and OS JCL for running VSAM COBOL programs
- IDCAMS statements for creating, printing, copying, and renaming VSAM files
- JCL for using the ISAM interface program supplied by IBM

There are over 50 illustrations in all, designed to help you learn about VSAM...and to serve as models when you're coding VSAM jobs on your own.

So why wait?

If you're not sure of all the answers when it comes to VSAM file handling in COBOL, get a copy of *VSAM for the COBOL Programmer* right way. I think you'll be surprised at how much knowledge you can get for $15.

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Interested in other aspects of COBOL training?

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Mike Murach & Assoc., Inc., 4222 W. Alamos, Suite 101, Fresno, CA 93711 V-1

Dear Mike: Please send me the books indicated below. They must teach me the COBOL subjects I want to learn, or I'll return them at any time for a full refund.

_____ **VSAM for the COBOL Programmer**, 147 pages, $15
_____ **Structured ANS COBOL, Part 1: A Course for Novices**, 498 pages, $20
_____ **Structured ANS COBOL, Part 2: An Advanced Course**, 458 pages, $20

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Siggraph attendee peers at slides depicting one exhibitor's offerings.



CW Photo by T. Scannell

Megatek makes its pitch to conference attendees.

Vendors Introduce Graphics Hardware And Visitors Get to Take 'Test Drives'

By Tim Scannell
CW Staff

BOSTON — It was Visitors 10 and the Home team 1 at last week's Siggraph '82 show here, but no one was complaining.

Attendees at the Association for Computing Machinery (ACM) Special Interest Group on Graphics' ninth annual exhibition and conference outnumbered the vendors by 10 to 1. The lookers were pleased because it gave each a chance to "test drive" the various systems, and the exhibitors were happy because they had a captive and highly interested audience.

Even though Siggraph '82 occurred almost a month to the day after the National Computer Graphics Association held its massive show in California — at which more than 60 products reportedly made their debuts — a number of vendors waited for the ACM event to launch their graphics offerings:

• Ridge Computers unveiled a high-performance 32-bit minicomputer graphics system said to offer up to four times the performance of Digital Equipment Corp.'s VAX-11/780 superminicomputer. The computer does not incorporate any internal microprocessors and includes a 60M-byte Winchester disk drive, floppy disk backup and a parallel line interface. It can handle up to four terminals. The computer's message-oriented operating system is a hybrid of Bell Laboratories' Unix.

The Ridge system is aimed primarily at scientific and engineering applications. A basic system ranges in price from $52,000 to $62,000.

Ridge Computers is headquartered at 586 Weddell Drive, Sunnyvale, Calif. 94086.

• Automated Graphics Technology announced a microcomputer-based presentation graphics system that can reportedly produce "instant" 35mm slides as well as full-color plotter hard copy and overhead transparencies. The Auto-Graphics system is aimed at the business market and incorporates a CPU with 128K bytes of memory, a two-pen plotter, two floppy disk drives and a slide processor.

Auto-Graphics carries an introductory price of $24,995. Its vendor is headquartered at 117 N. Second St., Minneapolis, Minn. 55401.

• Seiko Instruments, Inc., already involved in the European graphics market, used Siggraph to announce its entry into the burgeoning U.S. graphics field. The firm introduced a seven-color intelligent terminal and an intelligent monochrome terminal.

Both terminals are raster scan devices that incorporate integral display antialiasing at the hardware level, which reportedly corrects the jagged staircasing effect common to raster graphics.

Seiko's GR-2412 color terminal, which has a 128K buffer memory and local intelligence, costs $21,850 with software. The monochrome GR-2212 sells for $17,850. Both will be available the third quarter this year from Seiko's U.S.A. Division, Suite 140, 2620 Augustine Drive, Santa Clara, Calif. 95051.

• Chromatics, Inc. introduced a variety of products for its CGC 7900 graphics system, including a read-only memory (ROM) expander card that offers up to 128K bytes of ROM, 64K bytes of random-access memory (RAM) or 64K bytes of ROM and 32K bytes of RAM, priced at $1,295; a nine-track tape interface that costs $1,495; a 1,000 line/in. resolution digitizer tablet priced at $2,995; and a color printer interface costs $495.

All of the products will be available within the next two months from Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

• Hewlett-Packard Co. unveiled four graphics terminals for business and technical applications. The HP 2700 series terminals include the Model 65, a presentation graphics workstation; the Model 60, a decision support workstation; the Model 55, a technical design terminal; and the Model 50, an expandable base unit terminal. The devices range in price from $19,900 to $28,000.

First deliveries are scheduled for October. Additional information can be obtained from a local HP sales office, a company spokesman said.

• Versatec, a Xerox Corp. company, introduced a microprocessor-based controller that it said orders and rasterizes graphics data to offload electrostatic plot processing from IBM's 360, 370, 4300 and 30 series processors. The Model 780 controller emulates IBM 3211/3811 printer controller subsystems, can reportedly process files in less than six seconds and costs $20,000.

Deliveries of the Model 780 begin this month from Versatec, 2805 Bowers Ave., Santa Clara, Calif. 95051.

• Datacopy Corp. brought out a high-resolution digitizing system that can digitize alphanumerics, graphics and three-dimensional objects. The Digitizer/Viewer/Copier can digitize information in about 2.3 sec and produces camera output, display images and printed hard copy at 1:1:1 scale, a spokesman said.

The device interfaces to Digital Equipment Corp. LSI-11 and PDP-11 computers and costs $28,950. Datacopy is located at 1070 E. Meadow Circle, Palo Alto, Calif. 94303.

Show Attracts 170 Vendors

(Continued from Page 1)

While final attendance figures were not available at press time, a total of 17,000 people were expected at the conference, which is considered the leading showcase for state-of-the-art and experimental graphics technology. Like past shows, this year's event also boasted a series of full- and half-day courses, nearly all of which were sold out; a number of technical sessions; two graphics film festivals, touting both the old and the new; and an art show.

CW At Siggraph

While Siggraph is nine years old — an eternity in the fast-growing computer industry — it has experienced its greatest growth only in the past few years. For example, the organization's first show, held in Boulder, Colo., in 1974, attracted only 600 attendees and had no exhibitors. In 1975, show attendance dropped to about 350 people; a year later the show attracted only five or six exhibitors.

Last Year

Last year, however, Siggraph's Dallas show pulled in nearly 9,500 people, about 4,000 of whom came to attend the technical sessions and courses. And this year's preregistration tally almost matched last year's total, according to a Siggraph official.

At last week's show, more than $50 million worth of graphics and computer equipment occupied the one-acre floor space of the Hynes Auditorium, according to Richard Spann, Siggraph's exhibits manager.

"It is the largest collection of computer graphics vendors ever assembled," he claimed, "and all the graphics stuff you can lay your eyeballs on."

Although there was a heavy accent at last week's show on graphics' theatrical capabilities — with nearly every firm boasting how movies like *Tron* and *Star Trek, The Wrath of Khan* would not be possible without the support of computer-aided animation and graphics — the majority of vendors at the exhibition stressed the scientific and business uses for the technology.

Graphics Software Makes Splash at Show

BOSTON — Graphics software announcements vied with hardware introductions at Siggraph '82.

Digital Equipment Corp. introduced a device-independent package of graphics subroutines. VAX-11 Decor runs on the VAX line of superminis and is based on the ACM/Siggraph Core Graphics Systems recommendations; it provides a software interface between an application program and graphics devices.

VAX-11 Decor consists of Fortran and Bliss subroutines and costs about $7,500 for a single-system license. Deliveries are scheduled for the second quarter of 1983 by DEC, headquartered in Maynard, Mass. 01754.

Precision Visuals, Inc. unveiled a device driver, licensed for $500, that allows users of its DI-3000 Core-based software to implement the hardware and software capabilities of Raster Technologies, Inc.'s Model One display controller and workstation. The vendor is at 9 Executive Park Drive, N. Billerica, Mass. 01862.

The Blox Graphics Builder, said to allow developers to automatically create and document interactive graphics applications, was introduced by Rubel Software. Blox constructs on-line help and end-user documentation and offers table-driven control of the graphics screen.

Blox runs under DEC's VAX/VMS and RSX-11M and costs $8,000/CPU. However, Rubel is offering an introductory discount of $2,000 for orders received before Nov. 1. Rubel Software can be reached through P.O. Box 266, Cambridge, Mass. 02238.

Geographics Systems, Inc., a two-year-old firm, announced a nationwide, five-digit Zip Code mapping device that reportedly can be integrated with the firm's Geomap computer mapping software for business analysis. Zipmap costs from $20,000 to $30,000. Geographics Systems is at 100 Main St., Reading, Mass. 01867.

Video Appeal Called Widespread

Computer Graphics Seen Imaging's Future

By Jim Bartimo
CW Staff

CAMBRIDGE, Mass. — Six billion dollars were spent on video games in 1981 — twice as much as was spent on motion pictures, according to graphics expert Carl Machover. The president of Machover Associates Corp. pointed out that fact during Havard Computer Graphics Week to illustrate the appeal of this emerging technology.

The video appeal also applies to the business world, Machover said last week in his presentation, "Future Directions in Computer Graphics." "If there is a direction in the way images are being made, it's computer graphics," Machover said.

But graphics will be no more useful than other management information systems (MIS) techniques to executives unless there is a change in the information that is processed by the DP department, according to David Friend, chairman of the board and technical director of Computer Pictures Corp. of Boston.

"MIS has little to do with letting managers know what is going on," Friend said at the conference. "It's more closely related to accounting."

Information that lends itself to such business graphics techniques as bar charts and maps must be timely, offered in greater historical depth and supplemented with external data, he said. These three criteria are met under what Friend called "executive information systems" (EIS).

EIS differs from MIS by focusing on the information most needed by the manager for decision making. For instance, in EIS, absolute data accuracy is not as important as the speed with which it is delivered and the speed with which it can be absorbed.

A weekly financial report is better delivered two days after closing even if it is not accurate to the penny, Friend said. The data is only useful to the manager if it is in a short, concise form such as a chart or a graph.



Carl Machover

"Managers make very few decisions based on internal information," Friend said, citing the need for a data base that includes facts on competing companies, the general business climate and other external factors.

The company's own historical data must also be on-line to complete the long-term picture.

Once this information is available to the manager, it can be presented in an easily comprehended graphics format for both internal information and presentation purposes, Friend said.

"I've heard that managers don't like to use computer terminals. If there's something inside those terminals that can help them, they'll use it," he said.

Some problems in bringing computer graphics to the MIS environment were reviewed by Irwin M. Jarett of Irwin Jarettt & Associates, a Springfield, Ill., consulting firm.



David Friend

"Computers work well in business because we have a structured alphabet," he said, "Graphics are difficult because there is no standard sign language."

Jarett advised businesses that are installing graphics capabilities to spend considerable time on training to make clear to all users what each graphic represents. "The user first has to learn what a normal chart looks like before he can understand what the deviation looks like," he said.



CW Photos by J. Bartimo

Irwin M. Jarett

Businesses using graphics or manufacturing graphics equipment must also turn their attention to the health and safety matters of graphics terminals, according to Machover. The ergonomics of graphics workstations will become a major issue in the coming years, Machover warned.

State to Utilize Program to Keep Hunting to 'Bear' Minimum

By Susan Blakeney
CW Staff

GRAND RAPIDS, Minn. — There are barely enough bears to go around these days, but thanks to a computer program dreamed up by the Minnesota Department of Natural Resources (DNR) here, mama bear, papa bear and baby bear will have fewer intruders this year.

Convinced that black bears have been overharvested during the past two hunting seasons, the DNR is limiting the number of bear hunters here this fall by holding a computer drawing to select some 1,960 sportsmen from the more than 10,000 anticipated applicants.

Statistical analysis was conducted at the Grand Rapids Wildlife Research Center on a Wang Laboratories, Inc. 2200 computer system, which included the following information:

- In 1981, 10,306 bear licenses were issued and 1,660 bears were taken.
- In 1980, 8,667 licenses were sold, and 1,555 bears were killed.

The DNR is hoping to reduce the hunters' harvest to less than 500 bears this year and thinks the computer has the answer to the problem.

The program, devised by George Roberts at the DNR's Information Services Bureau, will generate a list of random application numbers. These numbers will be matched to the application files, and prospective hunters will be notified by mail of their status.

This program will run on the department's IBM 370 mainframe and will also be used for mailing-list purposes. The software for the program was developed by the Information Services Bureau staff.

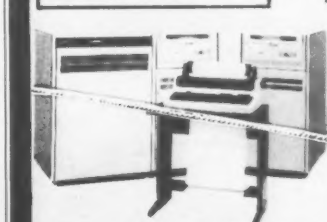
Bear hunters who wish to hunt in parties can apply as a group, and either every member of the party will be licensed or no one will. A DNR spokesman said that a preference system will be established, also, so that unsuccessful applicants this year will have a better chance next year.

The Department has also upped the price of a season's license (Sept. 11 to Oct. 24) from $7.50 to $14 for state residents; and from $25.25 to $100 for nonresidents.

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Managers on the Move



Kenneth D. Lloyd Jr.



Christopher S. McGarry



L. Argee Mahecha III

KENNETH D. LLOYD JR. has been appointed vice-president of Management Information Services at Atlas Van Lines, headquartered in Evansville, Ill. He will be responsible for the implementation of on-line management information systems (MIS) in support of the company's agents and subsidiaries.

Prior to joining the company, Lloyd served as an independent MIS management consultant and as a lecturer in the computer information systems program at Aquinas College in Grand Rapids, Mich.

He graduated from North Carolina State University with a B.S. in engineering.

•••

CHRISTOPHER S. McGARRY has been promoted to director of MIS at Saber Energy, Inc., an oil trading and refining company based in Houston.

Prior to joining Saber, McGarry held management positions with Deloitte, Haskins and Sells and Electronic Data Systems.

He received a BBA degree from the University of West Florida in Pensacola.

•••

L. ARGEE MAHECHA III has been appointed manager, process/management information systems, New York, for Philip Morris, U.S.A. He is responsible for the overall business systems planning, coordination and development of New York based information services.

Mahecha previously was manager of business systems marketing for the Pharmaceutical Division of Schering-Plough Corp. Prior to that he was a systems supervisor for Aetna Life & Casualty Co. and a systems analyst for Exxon-Intercol.

Mahecha graduated from Upsala College in East Orange, N.J., with a B.S. degree in international marketing and quantitative economics. He received an MBA from Fairleigh Dickinson University in Rutherford, N.J.

•••

WAYNE VANN has been promoted to manager of technical support and services for Centrilift-Hughs, Inc., a division of Hughes Tool Co., located in Claremore, Okla.

Vann joined the company as a programmer/analyst and was promoted to supervisor of technical services prior to his recent appointment. Before that, he served as a programmer analyst for Otasco.

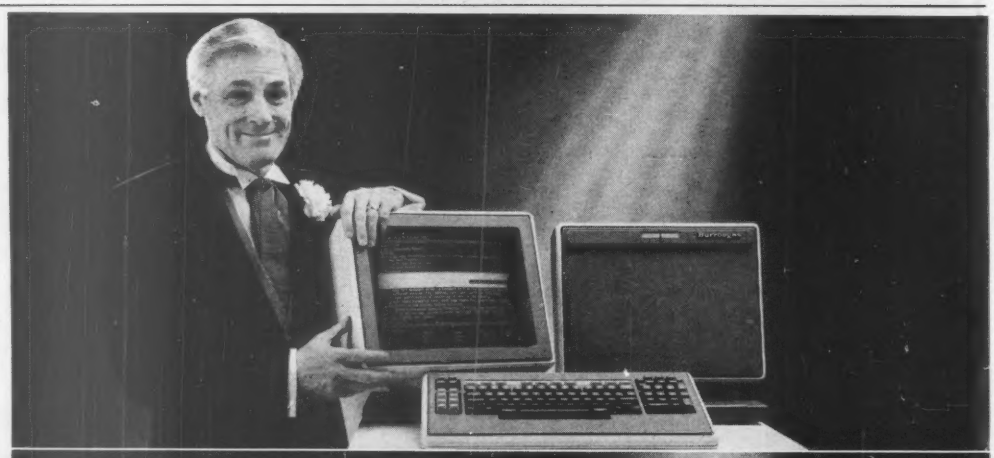
He holds an associate degree in data processing from Oklahoma State University.

•••

KARL G. KAMPER has been designated Data Services Division Manager of the Wyle Laboratories Electronics Marketing Group and will manage the Wyle data processing center in Huntington Beach, Calif.

Prior to accepting his new position, Kamper was manager of the Wyle Systems Development Department. He also has served with McDonnell Douglas Corp. and North American Rockwell in various information systems management capacities.

He earned a B.S. degree in business administration from California State University at Long Beach.







To Monitor Health

Nuke Group Seeks System for Transient Workers

By Bruce Hoard
CW Staff

BETHESDA, Md. — In a yet-to-be-released study, the Atomic Industrial Forum (AIF) has proposed the development of a computer system for monitoring the health of transient nuclear power plant maintenance workers. The AIF is a nuclear industry association oriented toward the peaceful use of nuclear energy.

Titled "Study of a Record Keeping System for Inprocessing of Transient Workers at Nuclear Power Plants," the study was designed to organize data on the approximately 4,000 to 6,000 transient workers who move around between the U.S.'s 71 on-line nuclear power plants.

According to Scott Leiper, project manager with the national environmental studies project at AIF, the proposed system would be fashioned around a centralized CPU and remote terminals on site at the nuclear plants. The study, which is scheduled for release later this month, reckons that an appropriate system could be developed for $150,000. That figure breaks down to $100,000 for software development, $30,000 for documentation and training and $20,000 for systems development and standardization, Leiper noted, adding individual plants would have to purchase or allocate dumb terminals at around $1,500 each.

The total cost would be shared among participating plants. "The price drops as more of them sign on," he said, adding, "There seems to be a lot of interest. It just depends on whether or not that interest can be translated into dollars."

He was optimistic about industry support based on private conversations with top management at some plants and survey data acquired from mid-level technical managers.

Asked if they thought such a system would be beneficial to them, 75% of the responding mid-level managers replied in the positive. The amount of money they would be willing to spend each month for the system ranged from none to $5,000, Leiper said.

If and when the system comes to fruition, it would be implemented incrementally with data on exposure records made available first. Other modules to follow would cover general health, security and training applications. The regions likely to benefit most from a system are those on the East Coast and around the Great Lakes where heavy concentrations of nuclear plants are located, he commented.

The project manager maintained that the system would streamline the now hit-or-miss process of keeping updated records on the amounts of radiation the transient workers are exposed to. "They could be processed quickly into any plant," Leiper stated.

Currently, workers and their former employees are responsible for forwarding pertinent personal data. In the case of workers, they may choose not to provide that data if they feel past radiation exposures are high enough to lock them out of future employment, he said.

Stumbling Blocks

Leiper said one of the stumbling blocks to developing the system is standardization of data between participating power plants. He also discussed others.

"Privacy and accuracy would have to be assured," Leiper observed. Along those lines, he referred to three recommendations in the study. The first states a "privacy impact statement" would be filed with an appropriate outside authority and communicated to individuals who would be effected.

The second notes "socially accepted standards of relevance and propriety" in the selection of personal data would be established. It goes on to say the individual worker should be fully aware of his responsibility to assure accuracy and completeness in his personal data. He would be required to sign a statement verifying that is so.

The third recommendation calls for individuals to be given a "clearly written account" of how their data will be used.

The Atomic Industrial Forum is located at 7101 Wisconsin Ave., Bethesda, Md. 20014.

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Robots Seen Displacing 15% of Workers by 1990

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Fifteen percent of current American manufacturing workers could lose their jobs by the end of the decade because of electronics technology, according to a congressional study that predicted federal aid to displaced workers could cost billions of dollars a year.

A new study by the Congressional Budget Office (CBO) predicted that the number of workers displaced by automation and the economic problems of numerous declining American industries could reach 2.1 million by the end of this year.

Employment in the electronics industry itself continues to grow, the CBO noted, with the annual employment growth rate in the computers and peripheral industry alone projected to be as high as 5.2% through 1990. But employment levels in the entire manufacturing sector of the economy will be adversely affected by microelectronic technology, the study added.

The CBO cited studies estimating industrial robots could eliminate one million to three million jobs in the near future and possibly up to seven million by the year 2000. "Although the degree of actual dislocation will be somewhat less than the number of jobs lost due to natural attrition and industrial retraining efforts, dislocation is likely to be substantially larger than in the previous period of rapid technological change begun in the 1950s," the report said.

Those workers whose jobs are lost because of manufacturing automation will not be rapidly absorbed in other sectors of the economy because there, too, electronics technology will reduce employment growth, according to the CBO.

Difficult Questions

All this confronts Congress with some "difficult questions" about aiding displaced workers, the study noted. While some view dislocation as a private market problem, "proponents of special aid contend that dislocated workers face a uniquely difficult employment situation, which warrants special assistance," the CBO told the Senate Budget Committee, which requested the study.

Even a modest program of income assistance and adjustment services, including job-search assistance, training and relocation aid for displaced workers could be extremely costly to the federal government, the CBO said.

For example, the CBO estimated a combination of various types of training programs for displaced workers could cost as much as $717 million in fiscal 1983 alone, depending on how eligibility requirements are established.

Also, extending unemployment benefits for only 10 weeks to displaced workers in the same period might cost as much as $920 million, the report said.

Extending unemployment assistance might be necessary, the CBO explained, because displaced workers have more difficulty finding new jobs than other unemployed workers, who can seek new jobs in their accustomed occupations.

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Course to Focus On IBM's SNA

SAN JOSE, Calif. — A three-day seminar on IBM's Systems Network Architecture (SNA) will be conducted here Aug. 16-18 by Communications Solutions, Inc. It is also slated to take place in Boston on Sept. 13-15; in San Jose, Calif., Nov. 15-17; and in Dallas, Feb. 7-9, 1983.

"SNA Architecture and Implementation" will focus on the practical applications, benefits and pitfalls of various SNA products. Course material reportedly provides data communications professionals with the necessary skills to design SNA networks and evaluate SNA-compatible products. The seminar is recommended for network designers, systems programmers, technical managers, marketing executives and others involved with SNA implementation.

Registration is $650 and includes all materials, lunches and refreshments. Further details on the seminar can be obtained from Communications Solutions at Suite 205, 10062 Miller Ave., Cupertino, Calif. 95014.

A/E Seminar Series Slated for Six Places

THORNDALE, Pa. — The A/E Systems Report and EMA Management Associates, Inc. have announced a seminar series, "Using Small Computers in the Professional Design Firm," which will be held in six locations this fall and winter.

The subject featured in the first day of the two-day seminar is "The Benefits of Microcomputer Systems: Considering/Selecting."

The second day covers "Leveraging Micro Equipment into a Productive Process."

The locations are Washington, D.C., Sept. 27-28; Denver, Sept. 29-30; Chicago, Oct. 25-26; Los Angeles, Oct. 27-28; Tampa, Fla., Nov. 8-9; and Kahuku, Hawaii, Jan. 17-18, 1983.

The cost for either day is $255; for both days the cost is $445.

A/E is located at 1145 Gaskins Road, Richmond, Va. 23233.

In Jeopardy: ISO Jobs, $15 Million

Calif. Welfare System Halted by Lawmakers

By Robert Batt
CW West Coast Bureau

SACRAMENTO, Calif. — A political furor broke out here following the suspension of a giant computerized welfare system for the state of California.

More than 150 people stand to lose their jobs and $15 million worth of investment has been placed in jeopardy. The suspension of the Statewide Public Assistance Network (Span) project came after intense lobbying by computer vendors IBM and Sperry Univac.

The decision to suspend the project came after the release of a harshly critical report by the Legislative Analysts Office. The report accused the Department of Social Services of lacking credibility in both its cost estimates and in meeting the schedule requirements.

Full strategic implementation of Span, it asserted, would not take place until 1987-88 — three years after the original deadline.

"There was a clear question mark over the department's credibility and as such we made a recommendation to terminate the project," said Hadley Johnson, one of the program analysts who prepared the report.

The California Department of Social Services has been working on Span for three years. The project was designed to provide an automated, statewide, centralized delivery system of benefits and services in such programs as Food Stamps, Medi-Cal and Child Support Enforcement Programs.

IBM vs. Univac

IBM was considered the vendor most likely to get the Span contract because initial prototypes had been drawn up using IBM-compatible equipment and project development was thought likely to follow similar lines. Univac, however, already has a heavy investment in the state, supplying the Los Angeles County System, which accounts for 36% of California's requirements.

The Univac system at Los Angeles is an 1100/44 system, soon to be updated to an 1100/83 with a network of 550 terminals.

Since Span was designed as an integrated project, "when the contract was put out to tender, Sperry would have had to include the conversion costs in its price, which would have put it at a competitive disadvantage vis a vis IBM," a Department of Social Services official noted.

The suspension of the project pending further evaluation is being seen by some here as a victory for Univac. The company retained the services of Donald Kent Brown — considered one of the state capital's most influential lobbying firms — to argue for its architecture.

Univac claims it has always supported the Span concept and denied reports that it sought to kill the project to prevent a loss of its business to IBM. Both companies refused to comment on the political implications of Span, but both made it clear they would be interested in any resurrection of the project.

Span was touted as one of the most ambitious state government computer projects so far devised and was thought likely by Department of Social Services developers to be used as a model for similar projects in other parts of the country. In total, 150 people were engaged in the project.

"So far we have lost 53 personnel, three years' expertise and $15 million because of the project's suspension," said one disgruntled government employee who asked not to be named. "This is the sixth attempt in the last 15 years to computerize the welfare system in this state, but we cannot move it along without getting caught up in political games."

If the project was implemented, the employee estimated, it would save $185 million a year in current administrative expenses.

"We are literally closing down shop. We have no choice since we have no money," the source said.

Although the Span project was suspended by the state legislators rather than cancelled, the findings in the Legislative Analyst's Office report drew a sharp response from the Department of Social Services.

Jim Meller, deputy director of the Information Systems Management Division at the department, commented, "clearly this was a political decision. Technically there were no grounds for suspending the project and we could have implemented it this year with no problem."

The next step lies with the State Budget Committee, which plans to hire a consultant to evaluate the alternatives and suggest a new way to get Span back on track.

Correction

The price for the *1982½ Software-Service-Vendor Directory* for IBM System/34 users was incorrectly listed in the June 14 issue. The publication costs $34.95, according to its publisher, Professionals Unlimited.

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To Confront World's Future Crisis

Scientific Energy Solution Urged by Professor

By Rita Shoor
CW Staff

ST. PAUL DE VENCE, France — The knowledge that we are confronted by an energy crisis comes as no surprise to anyone who remembers when people laughed at predictions that gas would eventually cost $1 per gallon. And one of the vital elements for dealing with this crisis is a computer that does not yet exist, according to Prof. Jim Swithenbank.

Swithenbank offered suggestions for that computer during a recent Sperry Univac seminar here on "The Information Technology Society."

With the exception of population growth, "the provision of energy to maintain the momentum of civilization is probably the biggest challenge now facing mankind," according to the academic from the Department of Chemical Engineering and Fuel Technology at England's University of Sheffield.

Since energy policy decisions involve so many interrelated factors, "we cannot simply 'believe' or 'think' that our actions represent the best possible response to the situation," Swithenbank said.

Instead, he argued the need for a more scientific approach utilizing a device that "would be capable of carrying out complex multidimensional correlations between many variables based on data which is acquired worldwide."

A basic data acquisition system already exists in the satellite and cable links that span the world, Swithenbank said. However, we lack a means to assimilate and extrapolate simultaneously such data in a continuously updated energy policy.

Too Slow

Conventional digital computers are too slow and were designed to evaluate numerical problems rather than "recognize similarity," Swithenbank said. The inherent serial operation of conventional computers also makes them susceptible to failure since a single fault can invalidate the eventual result, he continued.

In contrast, he proposed the development of a parallel system based on what he called a "recognition/correlation/sequence" computer.

Using optical principles to show what he meant by the term "recognition," Swithenbank explained that a hologram is formed when light scattered from an object interferes with a plane beam of light on a photographic emulsion.

When the developed plate is illuminated with a plane beam, the three-dimensional image of the original object is reconstructed; and if the hologram is illuminated with light scattered from the original object, the plane beam is recovered.

This can be considered a "flash of recognition between the object and its hologram," he said. If the object is then slightly changed, a smaller recognition signal is obtained and the differences are recovered. This idea can be extended to the identification of particular features and the possibility of achieving the solution is "just appearing on the horizon of micro-electric-optic technology," according to Swithenbank.

The RCS computer would evaluate a mathematical statement like 1+1=2 by recognizing the result from previously given information rather than by digital means, he continued. However, rather than requiring each specific answer to be stored, Swithenbank's theoretical machine would derive the result through indirect correlation of previously stored relations to the specific answer.

The operation might be compared to the human process of thinking through the sequence of a song by selecting the next note through its multiple correlation with the notes immediately preceding it and other information common to the particular tune, he said.

Although holograms are usually analog devices, the RCS computer would store information in binary form because microelectronics is well adapted to binary mode, he said.

While Swithenbank noted that there are some similarities between his proposed processor and certain features of the human brain, he warned against attempting to copy the brain. Developers should "define achievable tasks and manufacture equipment to best carry out those tasks."

However, the fact that the brain successfully uses binary elements with interference between signals passing down multiple paths should encourage computer designers in the attempt to develop an RCS computer, he said.

Once the machine existed, Swithenbank speculated that its first task would be to "identify patterns in the world scene relating energy use with economic and other motivations."

Will Computers Make Doctors Threatened Species?

By Rita Shoor
CW Staff

ST. PAUL DE VENCE, France — Surgeons and obstetricians will be with us for the foreseeable future. But today's medical student might do well to think again if he plans to specialize in an area of medicine that does not lean heavily on manual skill and dexterity.

The impact of computers in medicine may result in the disappearance of specialties ranging from child and adolescent psychiatry to nuclear medicine if a scenario drawn by the British Medical Association's (BMA) Dr. John Dawson is on target. Dawson, who heads up the BMA's Professional, Scientific and International Affairs Division, speculated about the effect of computer medicine on the medical profession during a Sperry Univac seminar conducted here recently.

In a presentation that asked "Are Doctors a Threatened Species?" Dawson explained that two broad areas of medicine — surgery and midwifery — are heavily dependent on manual skills. Since computers cannot currently be expected to develop manual dexterity, specialties like anesthesia or gynecology would tend to remain in existence, he said.

But a third medical area depends primarily on intellectual judgment, and doctors who specialize in this area — a group that would run the gamut from diagnosticians to psychiatrists — could see their areas of expertise beginning to disappear as early as 1995, according to Dawson. The specialties would eventually converge with doctors in this group offering only secondary medical care backed up by computers and expert systems, he said.

Patients might wind up performing a great deal of self-diagnosis, for example, if the right information is made available to them. Dawson visualized a videotex system that could guide someone to self-diagnose his illness through questions asked via a series of decision tables.

Beginning with general questions about the patient's medical status and history, the system's decision trees would lead to increasingly specific question paths that would eventually allow the patient to diagnose himself.

Thus, a previously healthy young adult who does not smoke or drink to excess and wakes up one morning with flushed skin, high temperature and a sore throat might be guided through a series of tables that would allow him to determine if he has the flu without ever visiting a doctor's office.

However, there are several factors that work against changes of the sort projected by Dawson.

The first involves the difficulty of getting a computer to perform examinations and diagnosis that depend on sensory input. Dawson illustrated this point with a list of 10 items that show a doctor how to examine a lump or swelling on a patient. "Duplicating that [examination] with a machine is obviously very difficult," he noted.

Another force against change is the fact that British doctors as a group have had their position stabilized by law, Dawson said.

In addition, there is a very high degree of organization in the medical profession and a complete lack of organization among patients, he continued.

There are also pressures that favor change in the medical profession, according to Dawson. He pointed to "groups of believers" who want to use currently available information to help identify hospitals that may be potentially high-risk institutions.

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Infodata Users To Meet Oct. 17 In Virginia

FALLS CHURCH, Va. — Infodata Systems, Inc. will hold its 1982 National User Meeting Oct. 17-21 at the Marriott Crystal Gateway Hotel in Arlington, Va.

The meeting will feature a user panel discussion on successful implementation and management of an information center. This will highlight users of Infodata's Inquire data base management system and IQ/Net product whose organizations have installed an information center, a spokesman said.

The users will cover such issues as what to expect from an information center, how to set one up, how to sell this concept within an organization and how to select and train information center personnel, according to the spokesman.

The conference also will include product updates, workshops and overviews by users about their applications of Infodata products. Any Inquire or IQ/Net user can attend, and the $275 per person registration fee includes attendance at workshops and general sessions, continental breakfasts, lunches and two dinner receptions.

Further information can be obtained by contacting Kathleen Condrey, Infodata User Meeting Coordinator, 5205 Leesburg Pike, Falls Church, Va. 22041.

Decision Support Theme of Expo

DAYTON, Ohio — "A Practical Approach to Decision Support Systems" (DSS) is the theme of the 1982 Corporate Planning Exposition, which is scheduled for October 6-8 at the Statler Hotel in New York City.

Sponsored by the North American Society for Corporate Planning (Nasp), the exposition will include formal vendor presentations, informal general discussions and personal consultations to present DSS software products and services. It also will include a technical program featuring presentations and panel discussions by DSS users and system vendors.

Among the speakers who will be featured during the seminar is Clayton W. Sundermeyer, manager of decision support applications for Mead Corp. He will discuss "Organizational Implications of DSS." Donald A. Heckerman, Mead's manager of financial modeling coordination, will speak on "The Role of Decision Support in the Executive Suite."

Registration fees for the Corporate Planning Exposition are $325 for Nasp members and $395 for nonmembers. Fees for additional executives from the same company are $275 for members and $345 for nonmembers. Nasp is located at 1406 Third National Building, Dayton, Ohio 45402.

American DP Helps China Tabulate Record Census

By Susan Blakeney
CW Staff

PEKING — The abacus has taken a back seat to 29 American-made computer systems here for the largest census compilation in recorded history.

China's estimated one billion people were counted during the first 10 days of July. The task involved 1,000 computer technicians, 4,000 data entry people, 100,000 coders, one million census supervisors and four million census takers. That adds up to 12 times more people than it took to construct The Great Wall two millennia ago, according to a recent report in the *Wall Street Journal*.

The 10-day data collection period reportedly ran on schedule, but the final results of this 19-question census will not be available until 1984. The massive undertaking should reveal the total population in China, mobility trends, education level and unemployment figures. Statistics on female fertility will also be generated. This information is being sought by the Chinese government to help it plan the sprawling nation's future development in terms of housing, employment and food supply.

The hardware imported for the job came from IBM and Wang Laboratories, Inc. The Chinese bought one 4341 and 20 4331 mainframe computers, along with 170 5280 data-entry machines from IBM. The terms of this contract were not disclosed.

According to an IBM spokesman, training was conducted in China from 1980 to 1981, and technical support was made available on-site.

The eight other computers purchased were Wang VS systems. Cost of this equipment was defrayed in part by a $15.6 million contribution from the United Nations, but the Chinese themselves are reportedly spending another $100 million on the census.

Manifold Problems

Financial implications aside, the problems of the mammoth census were manifold, according to prior reports. For example:

- China's behemoth population lives on more than 3.7 million square miles.
- Some citizens are afraid to report children that exceed population control policy standards (one child per city couple, two children for country dwellers).
- Some people are reluctant to report deaths in families, because cloth, grain and other rationed substances are subsequently cut back.
- Others fear increased taxes, male conscription or penalization for migrating to different locations without reporting the move.

Media Campaign

In an effort to ensure the census' success, the Chinese government launched a heavy media campaign to promote public awareness of the count's importance.

Billboards, matchboxes and posters flooded cities and towns, stressing the need for cooperation.

And for the most part, the masses seemed willing to cooperate. In a dry-run population tally conducted in the Wuxi region in 1980, the census reportedly fell just 632 short of the 9.5 million registered Chinese dwellers in the area.

Network Users Set Fall Symposium

BOSTON — The Network Users Association (NUA) will hold its fall symposium here Oct. 26-28.

Topics to be discussed during the first two days include the progress of network protocol standards, users' networking experiences and new office systems standards developments. The third day will be devoted to workshops aimed at determining user networking requirements and ways of promoting user needs.

The results of a recent nationwide local network user survey will also be discussed.

The registration fee is $75. Nonmembers may attend the first two days. The NUA can be reached at P.O. Box 98793, Seattle, Wash. 98793.

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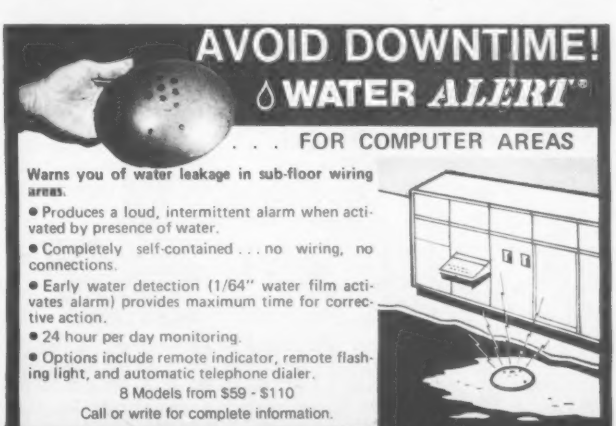
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Brother Hopes to Prevent Wars With Computers

By Bob Johnson
CW New York Bureau

NEW YORK — They may not be evident at "No Nuke" rallies, but thanks to Brother Austin David Carroll, computers are becoming active in the international peace effort.

The Roman Catholic clergyman, formerly director of data processing for the Brooklyn Archdiocese and currently assistant to the chancellor for information management systems for the New York Archdiocese, is implementing a project that will integrate an on-line system with information resources and computer model data bases in an attempt to find "nonviolent resolutions to world conflicts."

Carroll's base of operations is the Pope John Paul II Center for Prayer and Study for Peace in lower Manhattan, where he is director of research. He will install a Radio Shack Model 16 microcomputer and accompanying data base at the center that will link up with the New York Archdiocese's central Sperry Univac 90/60 CPU in Yonkers, creating a small network.

His plan calls for the creation of data bases and artificial intelligence (AI) models made up from information on peace efforts and human aggression studies he has accumulated over the years.

"We hope to build AI models that will analyze human aggression. For example, the Rand Institute models war games, and we plan to study human aggression models and try to discover whether we know enough about it in order to prevent violent actions," he said.

The computers and data bases involved in Carroll's project will serve participants whom the brother referred to as experts in the field of negotiations as well as peace authorities and activists. He explained that through the think tank at the peace center these experts will be able to tap the information resources and AI models in an effort to analyze specific situations of human conflict.

"This area of AI is currently employed to develop simulations of war strategies, economic modeling and such things as medical diagnosis. The plan of the center is to apply this technological tool to issues of peace and war," he noted.

International plans involve having peacemakers worldwide hooked up to the center's data base through their terminals with the ability to act as third-party negotiators to nations in conflict. Carroll said that the expert could check his data base information or model and possibly determine deteriorating relations that might lead from conflict to aggression. "The expert may be able to see a pattern developing through his AI model and warn the parties involved," he said.

Expert as Negotiator

The mechanics of the plan will include the expert linking to the countries in conflict through a terminal, via satellite to television cameras and monitors in each respective country. The expert could then act as the negotiator.

"Think of it as two planes entering a cloud and refusing to yield to each other, thus forcing both to be stuck there," Carroll said. "If they yield their control to a third-party ground controller they will both get out. If countries will yield their sovereignty to our expert then human conflicts might be resolved."

Although the system will be using the service of an existing satellite vendor, Carroll said that the Roman Catholic Church will launch the first part of its own satellite by the end of 1982, to which the system will eventually be linked. Carroll stressed that he believes the technology available today has a tremendous potential to serve humanity and he said this will be applied through his project by using computers and communications technologies to apply to the "war/peace cycle".

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from "Something in the Air" by Thunderclap Newman

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And you'll get a great story on the Epcot (Experimental Prototype Community of Tomorrow) Center — the new amusement park opening in September with computer technology by Sperry Univac. This is computer technology that will affect the community of tomorrow.

If you sell to Vice Presidents, Directors, DP Managers and other MIS professionals, here's where you'll find your buyers this October 27th. *Computerworld Extra!* will be read by more than half-a-million computer-involved readers including 116,988 paid subscribers, (ABC 12/31/81) and 423,720 pass-along readers (Becker Reasearch Corporation).

CW Extra! advertising close is July 23 and we'll be glad to give you more advertising information — as well as complete details on our subscribers and readers. Just contact your local *Computerworld* sales office or call Don Fagan, Vice President Sales, at (800) 343-6474. In Massachusetts call (617) 879-0700.

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Deltak Offers Course Series

OAK BROOK, Ill. — Deltak, Inc. is offering two video journal series co-developed with the Diebold Group, Inc.: No. 63-0XX, "Manufacturing Automation: A Key to Productivity" and No. 63-1XX, "Computers and Competition."

The first series runs three to five hours and is composed of five courses which explore the impact of technology on blue-collar workers through top-level managers. The five courses are, "The New Manufacturing Environment," "CAD/CAM," "Using Industrial Robots," "Implications for MIS" and "Implementation, Impact and Change."

The second series lasts between 45 minutes and 1½ hours. It was designed for executive management involved with competitive planning. The series first looks at the ways automation influences competition and then reviews actions executive managers can take to direct the computer's effect on that competition.

The courses are available for an average rental fee of $50- to $125/course/mo, depending on volume. Courses are also available for purchase at $1,750/course, Deltak said from 1220 Kensington Road, Oak Brokk, Ill. 60521.

Use of Computerese Necessary?

Q I am the liaison between my department, public relations, and our information systems group. Over the next two years we are implementing two new information systems and installing four word processing units. I meet almost daily with someone from information systems. I'm trying to learn as fast as I can, but it seems as if members of the information systems group revel in confusing me with jargon.

I don't want to appear uncooperative (or ignorant) and have kept my thoughts to myself. I'm such a novice at this that I'm assuming that they need to use this jargon to express their ideas.

Do people in other companies use the same confusing jargon or do they speak in plain English?

A By all means, mention your confusion with the continued use of jargon. In defense of your information systems friends, I doubt seriously that they are trying to befuddle you. A reminder to eliminate the jargon will do wonders to improve both the efficiency of communication and the quality of the resulting system.

As a liaison you will eventually learn some computerese through osmosis. In the meantime, you should take the initiative and develop an awareness and knowledge of computers and information processing. I'm sure the education coordinator of the information systems group will be happy to steer you in the right direction.

Q I will retire from the military in about a year with 10 years' experience in DP. During seven of those 10 years I was a programming manager and a systems analyst. The last three years I have been chief of a DP division with a $1.4 million budget. During this period I supervised the installation of a major hardware upgrade, upgraded the data base management system and directed the installation of an ad hoc query capability, a data dictionary and a remote on-line data entry and query system.

I have also laid out a budget project to support a five-year, long-range plan that I developed. The first year, I cut the previously established budget by $300,000 and have stayed within my own budget projections since.

With a B.S. and M.B.A., do I have enough DP experience and education to be marketable in the private sector even though I am 43 years old?

A The most apparent manpower deficiency in information services is not programmers or data base administrators, it's good management. If you can demonstrate a proven management ability, your age should be an asset. Orient your resume to highlight such past achievements as a long-range plan, budget reductions and smooth conversions for hardware and software. Profit-conscious organizations are always in search of skilled professionals in this age bracket. After all, you have 27 years remaining until retirement!

Q After five years as a programmer/analyst in the private sector, I've decided to teach data processing full time at a local junior college. Next semester I will be teaching three sections of a course entitled "Introduction to Business Data Processing."

My predecessor devoted five of 38 classes to numbering systems — binary, octal and hexadecimal. The text used last year has a heavy emphasis on numbering systems.

What is so important about an introductory DP student being able to divide in hexadecimal? It seems it would be more beneficial for the student to use this class time on more relevant topics. How much emphasis do you feel should be placed on numbering systems?

A Ten years ago students needed some familiarity with octal and hexadecimal to interpret diagnostics and core dumps and with binary because of the bit-oriented architecture of computers. The emphasis that some instructors and texts give numbering systems is an unnecessary holdover from the 1960s.

Today, it is difficult to rationalize more than 30 minutes of lecture on numbering systems.

Leave such topics to the math department or, perhaps, to more advanced courses with an emphasis on low-level languages.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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No Answers in Sight for TDF Issues: Attorney

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Transborder data flow (TDF) is an "exceedingly complex and rather nebulous problem" for which international regulations are lacking and agreement is rare, according to Robert Cassidy, an attorney for Kaye, Scholer, Fierman, Hays and Handler here.

Speaking at the recent Fourth General Assembly of the World Future Society here, Cassidy pointed out that it is the most advanced industrial countries that are concerned about the problem.

With no answers in sight, the questions remain: Is there a problem with TDF? Should governments meddle in the situation? Or are we just in a period of rapid technological change that naturally makes us uncomfortable?

"One reason there is no consensus on the issue is that the technology changes so fast that a regulation made today can be irrelevant tomorrow," Cassidy said.

Different Needs

In addition, the needs and concerns about TDF are different for the business community, consumers and governments. Furthermore, "it would be impossible to have multilateral negotiations on the subject because no one knows what they're negotiating about." Cassidy recommended bilateral negotiations on a narrow issue within the broader subject, for example, between Japan and the U.S.

One must ask whether the traditional rules of international trade are relevant for TDF, Cassidy said. "Most favored nation" treatment states that a country must treat imports the same from every country, while "national treatment" says a country must treat an imported product the same as one from its own country in terms of taxation and regulations on its use, he explained.

"These two general rules — at least 200 years old in concept — are easy to apply to tangible objects but not easy in the case of intangible communications," he said.

"The question of whether governments should be involved in this issue is one we've wrestled with for a long time," explained Nancy Adams, international economist in the office of the U.S. Trade Representative. "The issue has enormous commercial implications and the broad economic impacts are impossible to ignore."

Focusing on transferences of nonpersonal data, Adams noted that "technological advances in the last decades are changing how businesses conduct business." She cited banking, shipping and manufacturing, all of which use telecommunications for more efficient and economical worldwide operations.

"Enhanced services such as distributed data processing and electronic mail are highly marketable and the question of market structure is now being addressed by the U.S., as well as Japan, the UK and Germany," she added.

"Governments want to control change but they don't know the effects of change," she observed. "The uncertainty in business and government is preventing investments in major international networks."

To slow down the possible advent of restrictions regarding TDF, the office of the U.S. Trade Representative is proposing a "data declaration." "We're asking for a general commitment of governments not to discriminate and to guarantee a free flow of information with built-in consultation procedures," Adams explained, "and we're developing a store of information on the problem.

"We're encouraging governments not to take actions until we know more about the issue," she concluded. "This is just the first step in looking at possible solutions to the problems and hopefully finding those solutions."

Two-Way Home Communications Systems Predicted Spurring Data Trade, Collection

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The advent of two-way communications systems in the home will bring "more collection of data, more integration of data and more economic incentive to collect, keep and trade data," Fred Weingarten, program director in the congressional Office of Technology Assessment (OTA), said here recently.



CW Photo by M. Zientara
Fred Weingarten

Speaking at the Fourth General Assembly of the World Future Society, Weingarten stressed that these results "are not technology-driven" and that there is "a great deal of choice" regarding implementation of the technology.

OTA studies have indicated that the U.S. follows a selective approach to privacy legislation. If a problem is found in medicine or banking, a law will be written to deal with it, Weingarten said. "But due to the integrative nature of the technology, the lines between banking and stock market applications, for example, are difficult to draw," he observed.

In addition, while applications are also geographically integrated, there are different privacy laws in different states as well as across national boundaries. "There is also an increasing problem with control of access of data," he said. "Even when you have controls, it is very difficult to implement them." With the growing use of microcomputers, word processors, intelligent typewriters, door locks and other security devices, "there is increased potential for surveillance since it is getting cheaper to do and to process," Weingarten said.

"With the use of home computers, an employer can make an end run around some of the controls he faces at work," he added. "Even though he can't keep certain information at work, he can legally keep it at home on his own computer.

"The increase in work done electronically in the home will lead to more monitoring and intrusive capabilities," he predicted, "since the employer needs assurance that the work is being done."

Surveillance possibilities notwithstanding, the real threat to privacy and autonomy from interactive systems comes not from the government but from the commercial sector, according to Robert Ellis Smith, publisher of the *Privacy Journal* here.

Smith cited a Chicago market research firm that has recruited volunteer families in Pittsfield, Mass., to use ID cards whenever they visit the supermarket. "The checkout scanner now can send information on each families' choices back to Chicago by computer link, where the firm manipulates and stores the data. The company also uses the families in a cable TV experiment, in which each family receives a separate menu of advertising," Smith said. In that way, the firm can determine responses to its advertising.

"We will see more and more of these experiments," Smith predicted, adding that "editorial content, too, will eventually change." *Time* magazine now bases its advertising content on Zip Code and, in some cases, the editorial content is different, he indicated.

While there is no passport ban on travel to Cuba, Smith said, there is a ban on using "plastic" money there. "That's one example of Big Brother limiting our choices by directing the purchases we can make.

"In the future, why couldn't a government limit liquor sales to families on public assistance, for example?" he asked.

Two-Way 'Polling'

On the other hand, Smith sees an area that is not being utilized to its fullest advantage — two-way "polling." "Instead of asking weak questions like 'Do you like Reagan?' why don't they ask whether people plan to use the interstate the next morning and help avoid traffic jams?

"The danger lies in the possibility that commercial concerns will fill us up with electronic pabulum and put us to sleep," he concluded.

It is the "growing power of large organizations, such as AT&T, the Internal Revenue Service, the National Security Agency and the Federal Bureau of Investigation that we should worry about," according to David Burnham of the Aspen Institute here. The rules regulating banking and electronic funds transfer are unclear and with computerized polling "you might as well have a computer as your leader," he said.

"With the increase in working at home electronically, there will be more use of the quota system in areas that can't be quantified that way, such as counting column inches in reporting or tracking IRS case loads," he added, noting that such quotas "lead to bad judgment."

Electronic home monitoring systems can be tapped to reveal one's comings and goings, Burnham said, and electric power surges can be monitored to indicate illicit broadcasts in oppressed countries.



Institutional Change Paramount Factor For Prosperity in Information Age: Diebold



CW Photo by C. Marenghi

John Diebold

By Catherine Marenghi
CW Staff

WASHINGTON, D.C. — Institutional change — not technological breakthroughs — will be the key determinant of our country's prosperity in the Information Age.

That was the prediction of John Diebold, internationally known author and information management consultant, speaking at a keynote luncheon of the World Future Society's "Communications and the Future" conference here recently. "We need to rethink institutional change in our society because technology has outpaced our institutions," Diebold noted, calling for a "heroic sense of vision" in public policy decision making.

Forecasting is nothing new to the president of the New York-based consulting firm, The Diebold Group. His keynote marked the 30th anniversary of his book *Automation*, in which, at the age of 26, he uncannily predicted a number of the computer developments we know today.

Decrying the lack of a guiding vision in the U.S., Diebold quoted French President Francois Mitterand as saying, "The future determinant of French society will be the computer." Japan's Ministry of International Trade and Industry, according to Diebold, has also named the computer as "the main determinant of competitiveness in all fields."

What we need is to provide the same kind of guiding vision in the U.S. without creating a nondemocratic structure, Diebold warned.

History's Value

An avid student of the Industrial Revolution, Diebold emphasized the value of historical perspective in our preparation for the future. "Why was the Industrial Revolution a revolution?" he asked. "Not because the machines were revolutionary, but because they changed our lives.

"Today we have extraordinary technology, but we have enormous difficulty doing the simplest things."

What's holding us back? Diebold pinpointed the following problem areas in our government and social structures:

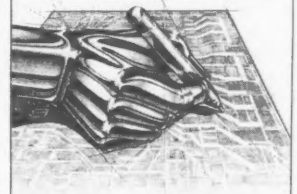
- A society that works against innovation and taking risks. Calling innovation the greatest strength of America, Diebold urged that risk taking be fostered as a value.
- A "time horizon problem," or shortsightedness, among our political decision makers. "The time scale of our decision making should include the lifetimes of our children and beyond." Instead, we have "a political system with thousands of places to veto things, but no way to examine trade-off opportunities, to say what we want to do, to set priorities."
- No way to deal with the present impact of future change. One solution, according to Diebold, is publicly funded "institutes of the future" to encourage and explore invention. Several of these would be in order, he suggested, so they could take opposing points of view.

Where, then, is the computer industry headed? Diebold mapped four major currents:

- After 30 years of growth, computing is shifting from a capital industry to one that is also a consumer industry, including products and services marketed directly (home computers) and indirectly (chips embedded in automobiles). Success in the consumer markets "will mean success in all products and services and will change all businesses," he said.
- Computers are becoming intertwined with major developments in other fields, such as biology and medicine. Extraordinary technological advances, combined with declining costs, will mean that "wherever the flow of information is important to human beings, we can build machines to handle that flow."
- Computers are beginning to change what we do, not just how we do it. "The parameters of competitiveness are becoming totally changed as a result of the imaginative use of technology," Diebold stated, noting that the electronic games market did not exist a few years ago.
- The period ahead will be characterized by an increasing array of public policy problems: What kind of communications policy should this country have? What antitrust laws? What privacy protection? Diebold noted that we have raised relatively few such issues so far.

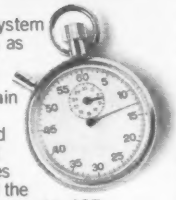
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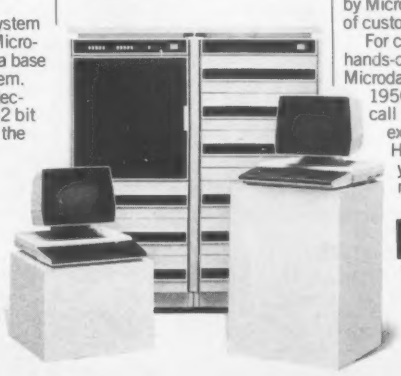


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Calendar

Aug. 16-18, Summit, N.J. — **MVS Dump Debugging.** Contact: Chubb Institute Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Aug. 16-18, San Francisco — **Local-Area Network.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Aug. 16-18, Minneapolis — **Audit Methodology for Data Base Systems.** Contact: Registrar, MIS Training Institute, Inc., 12 Juniper Lane, Framingham, Mass. 01701.

Aug. 16-18, Washington, D.C. — **Multiuser Communications Systems and Networks.** Contact: The George Washington University, School of Engineering and Applied Sciences, Washington, D.C. 20052.

Aug. 16-19, New York — **SMP4 Fundamentals.** Contact: Amdahl Corp., 1211 Ave. of the Americas, New York, N.Y. 10036.

Aug. 16-19, Stowe, Vt. — **The World of CAD/CAM.** Contact: Center for Manufacturing Technology, 4170 Crossgate Drive, Cincinnati, Ohio 45236.

Aug. 16-20, Chicago — **Systems Analysis and Design Workshop.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 16-20, Minneapolis — **Auditing in the Contemporary Computer Environment.** Contact: Marge Umlor, DP Auditors Foundation, 375 S. Schmale Road, Carol Stream, Ill. 60187.

Aug. 17, Boston — **Dealing With Vendors & Suppliers.** Contact: Performance Seminar Group, 11 Commerce St., Norwalk, Conn. 06850.

Aug. 17-18, Palo Alto, Calif. — **Future of the Communications Industry.** Contact: The Yankee Group, 89 Broad St., Boston, Mass. 02110.

Aug. 18-19, Cary, N.C. — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Aug. 18-19, Calgary, Alta. — **Distributed Systems: Concepts/Management Overview.** Contact: The Datamation Institute, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Aug. 18-20, Washington, D.C. — **Advanced Statistical Analysis System.** Contact: Applied Technology Associates, Inc., Suite 1418, 1710 Goodridge Drive, McLean, Va. 22102.

Aug. 18-20, Washington, D.C. — **Data Communications Network Design.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 18-20, Washington, D.C. — **How to Build and Use a Data and Information Resources Directory.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Aug. 19, Newton, Mass. — **HP New England Regional Users Group Meeting (Nerug).** Contact: Richard A. Barton, HP-Nerug, 310 Franklin St., Box 234, Boston, Mass. 02110

Aug. 19-20, San Francisco — **Strategic Planning for Users.** Contact: Telestrategies, Suite 102, 6842 Elm St., McLean, Va. 22101.

Aug. 19-20, New York — **Performance Appraisal of Professionals.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Aug. 22-25, Minneapolis — **Urban and Regional Information Systems Association (Urisa) 20th Annual Conference: Practical Applications of Computers in Government.** Contact: Urisa, Suite 300, 2033 M St., Washington, D.C. 20036.

Aug. 23, Boston — **Management Overview.** Contact: Information Methods (USA) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

Aug. 23-24, Los Angeles — **Structured Methodology.** Contact: Education Foundation of the Data Processing Management Association, P.O. Box 91295, Los Angeles, Calif. 90009.

Aug. 23-24, San Francisco — **Unix: Concepts, Functions, Applications.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Aug. 23-24, Chicago — **DP Contingency Recovery Planning/DP.** Contact: Education Department, Data Processing Security, Inc., 200 E. Loop 820, Fort Worth, Texas 76112.

Aug. 23-24, New York — **The Association for Computer Operations Managers Second Annual Conference.** Contact: Association for Computer Operations Managers, 935 S. Gilbert St., Anaheim, Calif. 92804.

Aug. 23-25, Washington, D.C. — **Software Project Development.** Contact: The George Washington University School of Engineering and Applied Science, Washington, D.C. 20052.

Aug. 23-25, Hartford, Conn. — **Vsam Performance Workshop.** Contact: Solutions, Inc., Box 989, Montpelier, Vt., 05602.

Aug. 23-25, Waltham, Mass. — **Introduction to Teleprocessing.** Contact: Bentley College, Center for Continuing Education, Beaver & Forest St., Waltham, Mass. 02254.

Aug. 23-25, Milford, Conn. — **Computer Operations Management and Data Control.** Contact: Franks/Monahan Systems, Inc., 89 Broad St., Milford, Conn. 06460.

Aug. 23-26, San Francisco — **Vsam Class.** Contact: David Lumadue, Software Education Corp., 649 Mission St., San Francisco, Calif. 94105.

Aug. 23-26, Newark, N.J. — **Vsam Fundamentals.** Contact: Amdahl Corp., 1211 Ave. of the Americas, New York, N.Y. 10036.

Aug. 23-27, Key Biscayne, Fla. — **Auditing in the Contemporary Computer Environment.** Contact: Marge Umlor, DP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

Aug. 24-27, Washington, D.C. — **Software Quality Assurance.** Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Aug. 24-27, Boston — **Information Analysis.** Contact: Information Methods (USA) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

Aug. 24-27, Washington, D.C. — **Software Quality Assurance.** Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Aug. 25-26, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box. 8000, Cary, N.C. 27511.

Aug. 25-27, Minneapolis — **Local-Area Networks.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Aug. 25-27, Phoenix — **Network Communication Protocols.** Contact: Center for Advanced Professional Education, 11928 Earlham, Orange, Calif. 92669.

Aug. 25-27, Salt Lake City, Utah — **Hewlett-Packard Users Group Conference.** Contact: Marlene Austin, Secretary-Treasurer, Suite 4, 438 E. 2nd S., Salt Lake City, Utah 84111.

Aug. 30-Sept. 1, Long Beach, Calif. — **International Conference HP 1000 Users.** Contact: HP 1000 International Users Group, 289 S. San Antonio Road, Los Altos, Calif, 94022.

Aug. 31-Sept. 3, Chicago — **Data Analysis.** Contact: Information Methods (USA) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

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CAM-I Meet Set Sept. 28-29

ARLINGTON, Texas — A public interest group meeting on computer-aided quality is scheduled to take place here Sept. 28-29.

The meeting is being conducted by Computer Aided Manufacturing-International, Inc. (CAM-I), and will concentrate on industrial requirements in the field of computer-aided quality assurance.

Technical presentations will cover topics such as integrating computer-aided quality assurance with computer-aided design and manufacturing; universal languages and standard interfaces to computerize inspection equipment; the computer as an aid to inspection; and the computer in support of data analysis.

Registration for the meeting costs $75 for CAM-I members and $100 for nonmembers.

Further details can be obtained from Nancy Marshall at CAM-I, Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

Videotape Series Examines SQL/DS

OAK BROOK, Ill. — Industry expert James Martin has teamed up with Deltak, Inc. to examine IBM's first fully supported relational data base software, SQL/Data System.

In its new training Series No. 81-54X — "SQL/DS and Relational Data Base Systems" — Deltak reportedly offers tactical and operation managers a look into this new technology via videotaped interviews with Martin and Michael Bushnell, IBM's senior product support administrator for the software.

The SQL videotape series is available for rental or purchase. Deltak courses rent between $50 and $125/course/mo, depending on volume.

Additional information can be obtained from Deltak at 1220 Kensington Road, Oak Brook, Ill. 60521.

HARDWARE ROUNDUP



A Look at 147 Systems From 26 Vendors

By Tom Henkel
CW Writer/Analyst

Last year, Computerworld's *Hardware Roundup corralled the characteristics of 98 mainframes and minicomputers. In all, 17 vendors were included in the survey.*

This year's update, which begins on the next page, includes characteristics of new processors and some additional vendors. A total of 26 vendors were polled and a total of 147 systems were evaluated.

No one ever said buying a computer was easy. Because of the multiple variables that must be considered, not every user can employ exactly the same evaluation criteria.

When a user goes out to buy a processor, individual factors such as whether the processor is the fastest on the market, offers the most storage or employs the most innovative technology are not necessarily of primary importance. The processor that gets the job done in the most efficient, most economical and least disruptive manner is the one to buy, according to consultants specializing in computer acquisitions.

With that in mind, *Computerworld's* 1982 Hardware Roundup should not be viewed as a buyer's guide. The intent is to present an overview of the mainframe and 32-bit minicomputer market. *Computerworld* does not endorse any specific vendor's product, architecture or methodology.

The 1982 Hardware Roundup is divided into three categories: IBM and plug-compatible mainframes, mainframes from other vendors and superminis. The last category represents a slight change from last year's Hardware Roundup. For the 1982 version, only processors that employ a 32-bit architecture were included.

With the exception of performance information, all figures in the accompanying charts have been supplied by the vendors. CW has calculated the relative performance and millions of instructions per second (Mips) categories based on vendor claims, user experiences and information supplied by independent consultants.

Since all processors are not alike, it is unfair to make direct performance comparisons of machines that employ different instruction sets, architectures, systems software and applications software. It is, however, possible to make broad approximations of how processors will perform relative to other processors on the market.

When using these numbers, remember that they are not the final word on performance. Actual processor power can vary greatly under different conditions.

It is the buyer's responsibility to determine whether a given processor will perform satisfactorily in his shop.

The *Computerworld* Relative Performance scale is an expansion of a rating system developed by International Data Corp. to evaluate IBM and compatible systems. Both rating systems are based on an IBM 370/158 Model 3 processor equaling 45. Mips information has been calculated based on the Relative Performance numbers. This was done because there is a great disparity in methods used to calculate Mips. Since a Mips scale comprised of unequal factors would be invalid, *Computerworld* calculated Mips based on the Relative Performance scale to ensure consistency.

IBM Mainframes and . . .

IBM

System / Characteristics	3033S	3033N	3033U	3033-A	3033-M
Relative Performance[1]	132	210	237	405	405
Mips[2]	2.3	4.6	5.0	9	9
Memory Size in Bytes (Minimum-Maximum)	4M-16M	4M-16M	4M-24M	4M-24M	4M-32M
Purchase Price[3] (Memory Size)	$990,000 (4M)	$1,505,000 (8M)	$1,968,000 (4M)	$10,426,500 (16M)	$4,158,000 (16M)
Lease Price (Lease Term)	$59,000 (4 Year)	$79,140 (4 Year)	$92,810 (4 Year)	$131,590 (4 Year)	$40,000 (4 Year)
Machine Cycle Time (Nsec)	57	57	57	57	57
Channels (Minimum-Maximum)	6 or 12	6-16	12-16	12-28	24-32
Cache (Buffer) Size	1K	16K	64K	64K	64K
Bus Architecture?	No	No	No	No	No
Price per 1M Byte Of Main Memory	$35,000	$35,000	$35,000	$35,000	$35,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor only.

IBM

System / Characteristics	8130	8140	System/38 Model 4	System/38 Model 5	System/38 Model 7	4321	4331-11	4331-2
Relative Performance[1]	12	20	13	16	32	11	18	22
Mips[2]	.2	.36	.2	.24	.52	.19	.26	.38
Memory Size in Bytes (Minimum-Maximum)	768K-1M	768K-2M	768K-2M	768K-2M	2M-4M	1M	1M-2M	2M-8M
Purchase Price (Memory Size)	$34,285[3] (512K)	$74,770[4] (1M)	$77,170 (768K)	$188,620 (768K)	$161,000 (2M)	$85,000 (1M)	$109,650 (1M)	$125,000 (1M)
Lease Price (Lease Term)	$1,102 (2 Year)	$2,600 (2 Year)	$2,230 (2 Year)	$5,505 (2 Year)	$6,100 (2 Year)	None	$4,155 (2 Year)	$4,945 (2 Year)
Machine Cycle Time (Nsec)	1,500	800	600 (Per 4 Bytes)	600 (Per 4 Bytes)	400 (Per 4 Bytes)	900 (Per 4 Bytes)	900 (Per 4 Bytes)	900 (Per 4 Bytes)
Channels (Minimum-Maximum)	None	None	1	1	1	2[5]	0-2[5]	0-2
Cache (Buffer) Size	None	None	None	None	None	None	8K	8K
Bus Architecture?	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$25,320	$25,320	$97,122	$97,122	$85,000	$15,000	$15,000	$15,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For an A21 processor with 29M bytes of direct access storage.
4. For a B71 processor with 58M bytes of direct access storage.
5. The processors use integrated adaptors instead of conventional channels.

IBM

System / Characteristics	4341-1	4341-11	4341-2	3083-E	3083B	3083-J	3081[4] Model D	3081[4] Model K
Relative Performance[1]	40	50	66	185	277	370	465	675
Mips[2]	.72	.88	1.1	3.1	5.7	7.9	10	18.8
Memory Size in Bytes (Minimum-Maximum)	2M-4M	4M-8M	2M-16M	8M-16M	8M-32M	8M-32M	16M-32M	16M-32M
Purchase Price[3] (Memory Size)	$256,400 (4M)	$275,000 (2M)	$390,000 (4M)	$1,200,000 (8M)	$2,020,000 (16M)	$3,020,000 (32M)	$3,720,000 (16M)	$4,320,000 (16M)
Lease Price (Lease Term)	$9,230 (2 Year)	$10,340 (2 Year)	$13,420 (2 Year)	$37,400 (4 Year)	$65,460 (4 Year)	$95,980 (4 Year)	$100,440 (4 Year)	$124,000 (4 Year)
Machine Cycle Time (Nsec)	150-300	120-240	120-240	26	26	26	26	26
Channels (Minimum-Maximum)	3-6	6	6	8-16	8-24	8-24	16-24	16-24
Cache (Buffer) Size	8K	8K	16K	Not Available	Not Available	Not Available	64K[5]	128K[5]
Bus Architecture?	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$15,000	$15,000	$15,000	$25,000	$25,000	$25,000	$25,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor only.
4. The 3081 processors employ dyadic, or two closely coupled, processors. The buffer size listed is per processor.

By Tom Henkel
CW Staff

IBM's product line has changed dramatically over the past year.

The firm expanded its mid-range 4300 line by adding four new processors and announced the three-model 3083 series, which analysts contend is a replacement for the aging 3033 line.

IBM also beefed up its top-of-the-line 3081 series with the Model K, the most powerful processor ever announced by the vendor.

Amid that flurry of introductions, most of the 3033 processor line drifted from the forefront of the IBM lineup. All but the 3033S have been removed from the "new production" list, according to IBM. However, since analysts consider the 3033 line a viable contender in the large-mainframe market (in terms of sales of used processors and lease-to-purchase conversions), the 3033 processors are included in this year's Hardware Roundup.

At the lower end, IBM expanded its System/38 line with a larger Model 7 processor, one of several high-end enhancements analysts expected for the 48-bit processor, which employs an object-oriented architecture.

But the most significant change in IBM's mainframe processor lineup was an alteration of the firm's system software policy. Last fall, IBM extended the user-accessable address space in its MVS and VM operating systems from 24 to 31 bits.

The results are called the MVS/XA and VM/XA operating systems. They allow users to run larger programs and take better advantage of the 32-bit architecture of IBM's large processors.

IBM watchers have long pointed to the aging MVS operating system as a stumbling block to bigger and faster processors from IBM. Analysts agree the extended addressing operating systems give IBM more powerful systems software to run faster processors while offering compatibility with older programs. However, analysts disagree on whether the extended addressing operating systems are an interim step or a permanant solution.

While not as significant as the extended addressing enhancements, IBM gave its low-end 4300 processor, the 4321, a new operating system, the Small Systems Executive (SSX). Basically a scaled-down version of the DOS/VSE operating system, SSX was designed for remote computing applications, according to the vendor.

IBM also claimed SSX is easier to use than DOS/VSE, requiring less skilled personnel at the remote site.

In Step With IBM

Plug-compatible manufacturers — those vendors that offer processors that are software compatible with IBM processors — have for the most part kept in step with IBM. Amdahl Corp. and National Advanced Systems, Inc., the two major contenders for IBM's large-mainframe markets, have announced new processors to compete with IBM's 3083 and 3081 CPUs. In addition, both have vowed to support IBM's extended addressing operating systems.

At the lower end of the plug-compatible line, Magnuson Computer Systems, Inc. and IPL Corp. introduced processors that compete with IBM's 4300 series.

Control Data Corp., which offered the Omega line of plug-compatible 4300-type processors, dropped out of the compatible processor market. CDC still, however, offers its line of IBM-compatible peripherals.



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41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897, Framingham, MA 01701-9985

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. . . the Plug-Compatibles

(Continued on Next Page)

NATIONAL ADVANCED SYSTEMS, INC.

Characteristics \ System	AS/3000N	AS/3000	AS/5000N	AS/5000E	AS/5000	AS/6130	AS/6150
Relative Performance[1]	40	50	50	60	62	66	86
Mips[2]	.72	.88	.88	1.0	1.1	1.1	1.4
Memory Size in Bytes (Minimum-Maximum)	2M-4M	2M-8M	2M-8M	2M-8M	2M-8M	4M-16M	4M-16M
Purchase Price[3] (Memory Size)	$215,000 (2M)	$250,000 (4M)	$300,000 (4M)	$400,000 (4M)	$500,000 (4M)	$348,000 (4M)	$420,000 (4M)
Lease Price[4] (Lease Term)	Variable	Variable	Variable	Variable	Variable	Variable	Variable
Machine Cycle Time (Nsec)	115	115	92	92	92	75	60
Channels (Minimum-Maximum)	5	3	6	6	6	6	6
Cache (Buffer) Size	2K	16K	4K	32K	32K	16K	32K
Bus Architecture?	No	No	No	No	No	No	No
Price per 1M Byte[5] Of Main Memory	$12,500	$12,500	$25,000	$25,000	$25,000	$13,750	$13,750

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
5. Main memory enhancements are available only in 4M-byte increments.

NATIONAL ADVANCED SYSTEMS, INC.

Characteristics \ System	AS/7000N	AS/7000	AS/7000 DPC	AS/9000N	AS/9000-2	AS/9060	AS/9000 DPC	AS/9080
Relative Performance[1]	105	143	243	214	393	708	510	920
Mips[2]	1.8	2.5	5.2	4.6	8.3	20.2	15.8	20.5
Memory Size in Bytes (Minimum-Maximum)	2M-8M	4M-16M	4M-16M	4M-24M	8M-32M	16M-32M	16M-32M	16M-64M
Purchase Price[3] (Memory Size)	$1,050,000 (4M)	$1,300,000 (8M)	$2,075,000 (8M)	$1,950,000 (4M)	$2,350,000 (8M)	$3,550,000 (8M)	$4,150,000 (16M)	$5,250,000 (16M)
Lease Price[4] (Lease Term)	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable
Machine Cycle Time (Nsec)	72	72	72	48	38	30	38	30
Channels (Minimum-Maximum)	6-8	8-16	12-16	8-24	8-24	16-24	16-32	16-32
Cache (Buffer) Size	16K	64K	64K	32K	64K	256K	128K	512K
Bus Architecture?	No	No	No	No	No	No	No	No
Price per 1M Byte[5] Of Main Memory	$50,000	$50,000	$50,000	$25,000	$25,000	$25,000	$25,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
5. Main memory enhancements are available only in 4M-byte increments.

AMDAHL CORP.

Characteristics \ System	470V/7C	470V/7B	470V/7A	470V/7	470V/6	550-5860	550-5870	550-5880
Relative Performance[1]	120	160	205	255	310	620	1,050	1,085
Mips[2]	2.1	2.8	4.5	5.4	6.9	17.8	22.9	23.4
Memory Size in Bytes (Minimum-Maximum)	4M-8M	4M-16M	4M-16M	4M-16M	4M-16M	16M-32M	16M-32M	32M
Purchase Price[3] (Memory Size)	$1,150,000 (8M)	$1,225,000 (8M)	$1,375,000 (8M)	$1,850,000 (8M)	$2,750,000 (8M)	$3,600,000 (16M)	$5,400,000 (16M)	$7,100,000 (32M)
Lease Price (Lease Term)	$52,150 (4 Year)	$54,285 (4 Year)	$60,245 (4 Year)	$70,960 (4 Year)	$76,100 (4 Year)	$90,350 (4 Year)	$135,525 (4 Year)	$178,200 (4 Year)
Machine Cycle Time (Nsec)	29	29	29	29	26	24	24	24
Channels (Minimum-Maximum)	8	8-32	8-32	12-32	12-32	18-34	16-32	36
Cache (Buffer) Size	32K	32K	32K	32K	64K	64K	64K	64K
Bus Architecture?	No	No	No	No	No	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$37,500	$37,500	$37,500	$37,500	$37,500	$25,000	$25,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

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The Plug-Compatibles

(Continued from Page 25)

MAGNUSON COMPUTER SYSTEMS, INC.

System / Characteristics	M80/30	M80/31	M80/32	M80/42	M80/43
Relative Performance[1]	16	26	32	45	54
Mips[2]	.24	.42	.56	.77	.92
Memory Size in Bytes (Minimum-Maximum)	1M-8M	1M-8M	1M-8M	2M-16M	2M-16M
Purchase Price[3] (Memory Size)	$93,850 (1M)	$116,000 (1M)	$146,000 (1M)	$183,000 (2M)	$228,000 (8M)
Lease Price (Lease Term)	$3,420 (2 Year)	$4,795 (2 Year)	$5,931 (2 Year)	$7,427 (2 Year)	$8,568 (2 Year)
Machine Cycle Time (Nsec)	100	100	100	100	100
Channels (Minimum-Maximum)	2-6	Not Available	3-6	3-16	6-16
Cache (Buffer) Size	None	None	None	16K	32K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$15,000	$15,000	$15,000	$15,000	$15,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, power supply, console and all prerequisites.

IPL SYSTEMS, INC.

System / Characteristics	4436	4443	4445	4446
Relative Performance[1]	27	45	56	70
Mips[2]	.43	.79	.94	1.2
Memory Size in Bytes (Minimum-Maximum)	1M-4M	2M-8M	2M-16M	2M-16M
Purchase Price[3] (Memory Size)	$187,000 (4M)	$277,000 (8M)	$322,000 (8M)	$384,000 (8M)
Lease Price (Lease Term)	$5,800 (2 Year)	$8,700 (2 Year)	$10,000 (2 Year)	$11,900 (2 Year)
Machine Cycle Time (Nsec)	50	50	50	50
Channels (Minimum-Maximum)	3-6	3-6	6	6
Cache (Buffer) Size	None	8K	8K	16K
Bus Architecture?	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$15,700	$15,700	$15,700	$15,700

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

CAMBEX CORP.

System / Characteristics	1636	1641	1651
Relative Performance[1]	23	35	52
Mips[2]	.39	.59	.90
Memory Size in Bytes (Minimum-Maximum)	1M-4M	2M-8M	2M-8M
Purchase Price[3] (Memory Size)	$120,000 (1M)	$170,000 (2M)	$270,000 (4M)
Lease Price (Lease Term)	$4,160 (2 Year)	$6,390 (2 Year)	$10,183 (2 Year)
Machine Cycle Time (Nsec)	50	50	50
Channels (Minimum-Maximum)	3-5	3-5	5-6
Cache (Buffer) Size	None	8K	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$15,000	$15,000	$15,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

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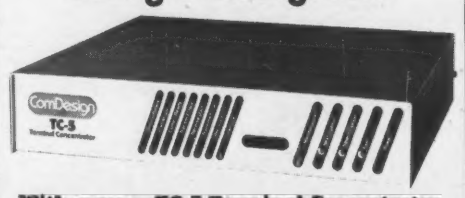
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Other Mainframers' Systems

By Tom Henkel
CW Staff

While mainframes from IBM and plug-compatible vendors make up about 75% of the market, IBM is not the only game in town.

In 1981, according to figures from International Data Corp. (IDC), Honeywell, Inc. had about 8.9% of the international mainframe market, followed by Sperry Univac with 8% and Burroughs Corp with 6.7%. NCR Corp. accounted for about 2.7% and Control Data Corp. for about 2.4%; other vendors vie for about 1.7% of the international market.

Non-IBM mainframers tend to compete in two basic ways. Some fill gaps in the IBM product line, while others offer an alternative.

While the phenomenal growth of the 32-bit supermini market and the increasing power of minicomputers have prompted some analysts to predict the demise of mainframes, the past year has indicated the opposite. In fact, mainframes appear to be getting bigger and faster.

Univac made the most recent high-end addition to its lineup with the 1100/90 series, a large-scale processor featuring up to 16M words of main memory and what it claimed is roughly twice the throughput of IBM's biggest processor, the 3081K. Control Data Corp. also recently announced the Cyber 170/800 series of processors, which expands that firm's large-processing capabilities to almost equal with IBM's 3081K.

However, analysts view large-processor announcements by the other mainframers as efforts to appease those firm's existing customers, rather than an attempt to steal customers from IBM. Companies using large mainframes are almost inexorably tied to the operating environment of their mainframe processor. To migrate from a Univac to an IBM processor or vice versa can be a time-consuming and disruptive exercise.

Of the mainframe vendors, Bur-

(Continued on Page 28)

BURROUGHS CORP.

System / Characteristics	B1955 (1955)	B2900	B5900	B6900	B7800[7]
Relative Performance[1]	19	28	30	61	199
Mips[2]	.27	.44	.54	1	4.4
Memory Size in Bytes (Minimum-Maximum)	524K-2M	512K-5M	1.5M-6.3M	2.3M-6.2M	3M-6.3M
Purchase Price[3] (Memory Size)	$104,000 (524K)	$161,000 (512K)	$240,000 (3M)	$440,000 (3M)	$1,700,000 (3M)
Lease Price (Lease Term)	$3,191 (3 Year)	$4,830 (3 Year)	$7,390 (3 Year)	$12,840 (3 Year)	$57,000 (3 Year)
Machine Cycle Time (Nsec)	167 or[5] 250	Not Available	Not Available	Not Available	Not Available
Channels (Minimum-Maximum)	4-15[4]	7-32	5-32	6-64	28-140[6]
Cache (Buffer) Size	8K	None	None	None	18K
Bus Architecture?	No	No	No	No	No
Price per 1M Byte Of Main Memory	$23,000	$15,000	$25,445	$31,807	$50,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor, console, power supply and all prerequisites.
4. The B2900 uses a data link processor in place of conventional I/O channels.
5. Machine cycle time is 167 nsec when operating at 4 MHz and 259 nsec at 6 MHz.
6. The B8700 uses I/O processors in place of conventional block multiplexing channels.

HONEYWELL, INC.

System / Characteristics	DPS 7/35	DPS 7/45	DPS 7/55	DPS 7/65	DPS 8/20	DPS 8/44	DPS 8/50	DPS 8/52	DPS 8/62	DPS 8/70
Relative Performance[1]	16	22	29	40	22	35	66	61	82	107
Mips[2]	.24	.38	.45	.72	.38	.59	1.1	1.0	1.4	1.8
Memory Size in Bytes (Minimum-Maximum)	1M-2M	1M-4M	2M-4M	2M-4M	2M-4M	2M-4M	2M-8M	2M-8M	2M-32M	2M-64M
Purchase Price[3] (Memory Size)	$94,200 (1M)	$128,700 (1M)	$202,400 (2M)	$256,700 (2M)	$149,350[4] (2M)	$198,000[4] (2M)	$285,000[4] (2M)	$450,000[4] (2M)	$680,000[4] (2M)	$1,191,000[4] (2M)
Lease Price[3] (Lease Term)	$2,767 (5 Year)	$3,660 (5 Year)	$5,646 (5 Year)	$7,184 (5 Year)	$5,211 (5 Year)	$7,536 (5 Year)	$12,363 (5 Year)	$19,520 (5 Year)	$23,615 (5 Year)	$35,272 (5 Year)
Machine Cycle Time (Nsec)	330	330	140	140	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Channels (Minimum-Maximum)	2	3-6	3-6	4-8	20	20	54	54	54	54
Cache (Buffer) Size	None	None	None	None	8K	8K	32K	32K	32K	32K
Bus Architecture?	No	No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$15,700	$15,700	$15,700	$15,700	$34,500	$34,500	$70,000	$70,000	$70,000	$70,000

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2. CW estimates.
3. For the processor only.
4. Includes processor and System Control Unit.

CONTROL DATA CORP.

System / Characteristics	Cyber 170/ 120	Cyber 170/ 730	Cyber 170/ 740	Cyber 170/ 750	Cyber 170/ 760	Cyber 170/ 825	Cyber 170/ 835	Cyber 170/ 855	Cyber 170/ 865	Cyber 170/ 875	Cyber 176
Relative Performance[1]	47	65	155	274	368	47	71	88	132	137	614
Mips[2]	.79	1.1	2.7	5.7	7.8	.79	1.2	1.5	2.3	2.4	17.7
Memory Size in Bytes[4] (Minimum-Maximum)	98K-262K	131K-262K	131K-262K	131K-262K	131K-262K	262K-1,048K	524K-2,097K	524K-2,097K	262K-1,024K	262K-1,024K	131K-262K
Purchase Price[3] (Memory Size)	$460,950 (180K)	$731,315 (200K)	$1,492,500 (200K)	$2,310,025 (200K)	$3,100,440 (200K)	$370,000 (262K)	$820,000 (524K)	$1,935,400 (524K)	$2,400,000 (262K)	$3,230,000 (262K)	$4,505,460 (200K)
Lease Price (Lease Term)	$8,040 (1 Year)	$13,275 (1 Year)	$36,315 (1 Year)	$51,930 (1 Year)	$69,450 (1 Year)	$8,605 (3 Year)	$20,500 (3 Year)	$48,385 (3 Year)	$72,500 (3 Year)	$95,000 (3 Year)	$91,583 (1 Year)
Machine Cycle Time (Nsec)	50	50	25	25	25	50	56	64	25	25	27.5
Channels (Minimum-Maximum)	12-24	12-24	12-24	12-24	12-24	12-24	12-24	12-24	12-24	12-24	12-24
Cache (Buffer) Size	98K	131K	131K	131K	131K	None	2K-4K	2K-4K	None	None	131KW
Bus Architecture?	No	No	No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$189,000	$189,000	$189,000	$189,000	$315,000	$45,000	$48,000	$118,000	$97,000	$394,000	$461,000

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2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. CDC measures its main memory in words rather than bytes.

Other Mainframers' Systems

(Continued from Page 27)

roughs Corp. and Digital Equipment Corp. were the only two that did not make some alteration to their product line over the past year. NCR restructured its product lineup, but did not change its two high-end processors, the V8650 and V8670.

International Data Corp. figures show that shipments of mainframe processors in 1980 were about 3.4% of the total worldwide shipments of processors. By 1985, IDC estimates, that percentage will have dropped off to about 1.1% of the total.

The value of mainframe processors accounted for about 64% of the total system shipments in 1980, according to IDC, which predicted it will drop to about 40% by 1985.

About 50% of mainframe users in 1981 purchased their processors, while 34% leased them through the manufacturer. The remaining 16% used a third-party leasing arrangement, IDC said.

UNIVAC

System / Characteristics	System 80 Model 3	System 80 Model 4	System 80 Model 5	System 80 Model 6	90/80 Model 3
Relative Performance[1]	12	14	18	21	46
Mips[2]	.20	.20	.26	.37	.78
Memory Size in Bytes (Minimum-Maximum)	262K-4M	512K-4M	262K-4M	512K-4M	1M-8M
Purchase Price[3] (Memory Size)	$59,261 (262K)	$66,082 (262K)	$82,241 (262K)	$94,062 (512K)	$959,192 (4M)
Lease Price (Lease Term)	$1,677 (5 Year)	$2,066 (5 Year)	$2,069 (5 Year)	$2,256 (5 Year)	$21,605 (5 Year)
Machine Cycle Time (Nsec)	180	180	180	180	98
Channels (Minimum-Maximum)	1 or 3	1 or 3	1 or 3	1 or 3	2-8
Cache (Buffer) Size[4]	None	None	None	None	32K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$23,284	$23,284	$23,284	$23,284	$45,064

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. Systems are available with a disk cache memory ranging from 32K to 1M bytes.

DIGITAL EQUIPMENT CORP.

System / Characteristics	Decsystem-10 1091	Decsystem-20 2060
Relative Performance[1]	72	72
Mips[2]	1.3	1.3
Memory Size in Bytes (Minimum-Maximum)	1M-12M	1M-8M
Purchase Price[3] (Memory Size)	$476,000 (1M)	$446,000 (1M)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	133	133
Channels (Minimum-Maximum)	3-12	3-12
Cache (Buffer) Size	9K	9K
Bus Architecture?	No	No
Price per 1M Byte Of Main Memory	$30,000	$30,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply, a minimum tape and disk configuration and all prerequisites.

UNIVAC

System / Characteristics	1100/81 CH1	1100/81	1100/82	1100/83	1100/84	1100/91	1100/92	1100/93	1100/94
Relative Performance[1]	70	114	208	307	397	345	485	915	1,150
Mips[2]	1.2	2	4.5	5.9	8.4	7.5	14	20	25
Memory Size in Bytes (Minimum-Maximum)	2M-8M	2M-32M	2M-32M	4M-32M	4M-32M	8M-64M	8M-64M	8M-64M	8M-64M
Purchase Price[3] (Memory Size)	$693,177 (2M)	$318,175 (2M)	$2,414,475 (2M)	$4,242,872 (6M)	$5,414,871 (8M)	$2,865,660 (8M)	$4,784,953 (8M)	$7,112,246 (16M)	$8,941,539 (16M)
Lease Price (Lease Term)	$13,077 (5 Year)	$29,045 (5 Year)	$45,108 (5 Year)	$79,226 (5 Year)	$101,115 (5 Year)	$86,740 (5 Year)	$122,931 (5 Year)	$171,472 (5 Year)	$204,939 (5 Year)
Machine Cycle Time (Nsec)	116	50	50	50	50	30	30	30	30
Channels (Minimum-Maximum)	5-28	6-26	26-52	52-104	52-104	12-176	12-176	12-176	12-176
Cache (Buffer) Size	32K	16K-32K	32K-64K	96K-128K	96K-128K	32K	64K	96K	128K
Bus Architecture?	No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$32,151	$79,000	$79,000	$79,000	$79,000	$20,000	$20,000	$20,000	$20,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

NCR CORP.

System / Characteristics	V-8535-II	V-8545-II	V-8555-II	V-8565-II	V-8575-II[4]	V-8585-II[4]	V-8595-II[4]	V8650	V8670[4]
Relative Performance[1]	8	12	17	21	32	40	48	116	212
Mips[2]	.08	.2	.25	.37	.56	.72	.80	2.0	4.6
Memory Size in Bytes (Minimum-Maximum)	1M	1M-2M	2M-6M	2M-6M	2M-6M	2M-6M	4M-8M	4M-8M	4M-16M
Purchase Price[3] (Memory Size)	$59,370 (1M)	$63,240 (1M)	$82,000 (1M)	$139,000 (2M)	$178,250 (2M)	$248,000 (2M)	$341,000 (4M)	$1,189,000 (6M)	$1,813,000 (8M)
Lease Price (Lease Term)	$2,490 (3 Year)	$2,647 (3 Year)	$3,480 (3 Year)	$5,876 (3 Year)	$7,490 (3 Year)	$10,425 (3 Year)	$14,356 (3 Year)	$39,125 (3 Year)	$56,921 (3 Year)
Machine Cycle Time (Nsec)	112	84	56	56	56[5]	56[5]	56[5]	38	38[5]
Channels[6] (Minimum-Maximum)	1-4	1-6	1-6	0-8	0-8	0-8	0-8	16-32	16-32
Cache (Buffer) Size	None	None	None	None	None	None	None	32K	128K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$14,100	$14,100	$14,100	$14,100	$14,100	$14,100	$14,100	$34,500	$34,500

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. Dual processor.
5. For each processor.
6. NCR said each I/O channel is capable of supporting up to four strings of devices.

The Superminis

By Tom Henkel
CW Staff

While the field of mainframe vendors tends to remain somewhat constant, the 32-bit minicomputer market changes rather rapidly.

Companies like Formation, Inc., Stratus Computer Corp. and Charles River Data Systems, Inc. — virtually unknown a couple of years ago — now compete with major firms like Prime Computer, Inc., Hewlett-Packard Co. and Digital Equipment Corp. for a share of what has been called the supermini market.

Thirty-two-bit minis tend to fall into three broad categories:

• In the commercial systems market, upper end 32-bit processors challenge small mainframes while small 32-bit processors threaten to make 16-bit processors obsolete.

• But superminis are also being used for specialized applications. Apollo Computer, Inc. uses a 32-bit minicomputer connected to the firm's Domain local-area network to make a system with intelligent workstation capabilities as well global resource sharing; the system is typically used in graphics and computer-aided design and manufacturing applications. Formation's 4000 line of IBM 370 software-compatible processors employs a fail-soft feature that the vendor claims allows users to continue processing in the event of a hardware failure. Likewise, Stratus makes a redundant 32-bit system.

• The last and certainly not least application for 32-bit minis is the scientific processing market. Harris Corp. processors have traditionally been aimed at a combination commercial/scientific marketplace. Recent announcements by Gould, Inc.'s SEL Computer Systems Division of the 32/8750 and 32/8780 processors were aimed strictly at the scientific sector. Processors developed by Computer Design Systems, Inc. were also aimed at the scientific market, particularly at users of IBM systems looking for a scientific power enhancement.

Charts of superminis continue on Pages 32 and 33.

While 32-bit processors have been around for about eight years, analysts say less than half of the software said to be for superminis is really geared specifically for those processors. Just as IBM expects a performance improvement from an expansion of its large-mainframe systems software from 24 to 32 bits, supermini users can expect greater performance from their machines as more 32-bit programs are developed.

According to figures released by Data General Corp., 32-bit systems made by all vendors accounted for about 7% of the international minicomputer revenues during 1980. DG estimated that figure will expand to 15% by 1983.

A New York market research firm, MSRA, Inc. estimated the supermini market will grow by about 56% per year until 1985.

The advantage of superminis over conventional mainframes is that minicomputer architectures are more agreeable to a multiuser interactive processing environment than many mainframes. In addition, minis are sometimes easier to use, usually require less power and usually do not need special temperature environments.

DIGITAL EQUIPMENT CORP.

System / Characteristics	VAX-11/730	VAX-11/750	VAX-11/780
Relative Performance[1]	20	40	62
Mips[2]	.36	.72	1.06
Memory Size in Bytes (Minimum-Maximum)	1M-5M	512K-8M	512K-8M
Purchase Price[3] (Memory Size)	$48,900 (1M)	$84,900	$219,100
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	810	320	200
Channels (Minimum-Maximum)	1	1-5	1-8
Cache (Buffer) Size	None	4K	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$9,000	$7,000	$7,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply, systems software and a minimum tape and disk configuration.

HONEYWELL, INC.

System / Characteristics	DPS 6/92	DPS 6/96
Relative Performance[1]	38	38
Mips[2]	.62	.62
Memory Size in Bytes (Minimum-Maximum)	1MB/4M	1MB/16MB
Purchase Price[3] (Memory Size)	$126,000 4M	$146,000 16M
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	300	300
Channels (Minimum-Maximum)	2-64	2-112
Cache (Buffer) Size	8KB	8KB
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	$28,000	$28,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console and 80M bytes of disk storage.

PRIME COMPUTER, INC.

System / Characteristics	Series 50 250II	Series 50 550II	Series 50 750	Series 50 850
Relative Performance[1]	32	38	60	93
Mips[2]	.56	.62	1.06	1.63
Memory Size in Bytes (Minimum-Maximum)	512K-2M	512K-4M	1M-8M	2M-8M
Purchase Price[3] (Memory Size)	$48,500 (512K)	$120,500 (2M)	$211,000 (4M)	$333,000 (4M)
Lease Price (Lease Term)	$1,358 (3 Year)	$3,374 (3 Year)	$5,908 (3 Year)	$9,324 (3 Year)
Machine Cycle Time (Nsec)	160	160	160	160
Channels (Minimum-Maximum)	3-4	12	13	13
Cache (Buffer) Size	2K	8K	16K	32K
Bus Architecture?	No	No	No	No
Price per 1M Byte Of Main Memory	$19,000	$19,000	$19,000	$19,000

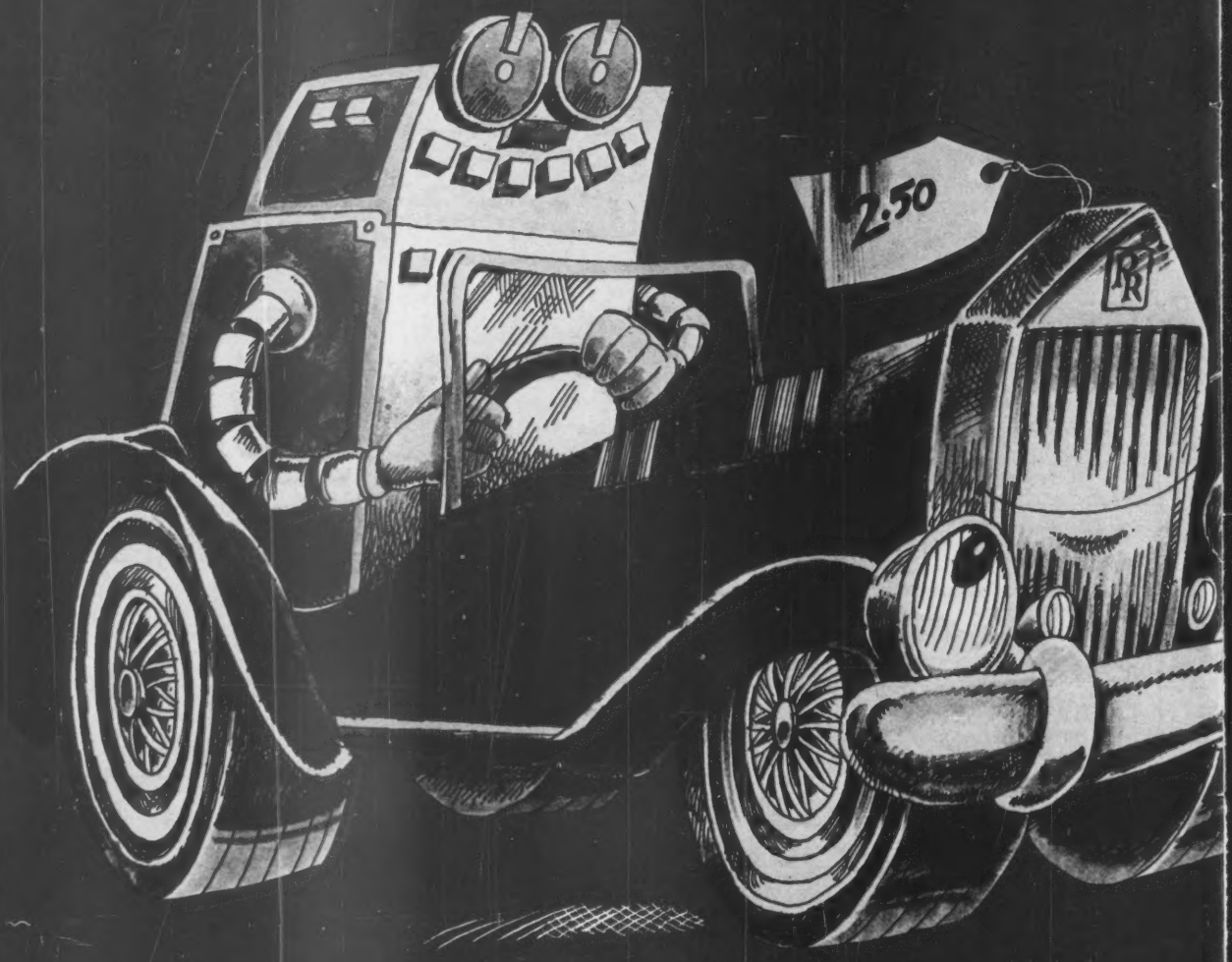
1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

PERKIN-ELMER CORP.

System / Characteristics	3210	3220	3230	3240
Relative Performance[1]	50	50	50	50
Mips[2]	.88	.88	.88	.88
Memory Size in Bytes (Minimum-Maximum)	512K-4M	256K-4M	512K-8M	512K-8M
Purchase Price[3] (Memory Size)	$49,900 (512K)	$50,050 (256K)	$64,150 (512K)	$113,000 (512K)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Nsec)	250	250	250	250
Channels (Minimum-Maximum)	4	7	8	32
Cache (Buffer) Size	None	1K	1K	8K
Bus Architecture?	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$15,900	$32,000	$23,900	$23,900

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2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

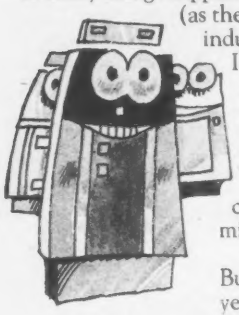
"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

We are CW Communications/Inc. and despite our youth (only 15 years) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

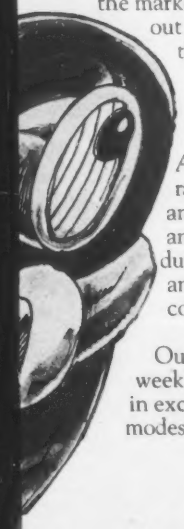
Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear).



In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. In the next two years alone, installed power of general purpose computer systems will grow almost as much as it did in the previous 16 years. And the supercomputers of the 90's will transfer data at a rate several hundred times faster than even today's speedy computers! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $90 Billion, and growing by 20% a year.





A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 114,000 (quite an increase from our modest 7,500 in 1967).

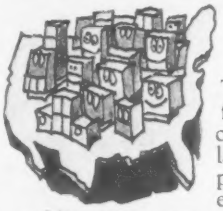


COMPUTERWORLD serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

COMPUTER BUSINESS NEWS is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.



The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD*. We report from the user's point of view — with product ratings, and information on using small computers in business and at home. It's a paid circulation, weekly newspaper, and the only publication of its type — located right in the middle of silicon valley — where it's all happening.



The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil, Mexico, France, Spain and Denmark.

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Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to hundreds of thousands of computer people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Roy J. Einreinhofer, *Vice President, Marketing.*

CW COMMUNICATIONS/INC.

375 Cochituate Road, Box 880
Framingham, MA 01701 (617) 879-0700

The Superminis

APOLLO COMPUTER, INC.

Characteristics \ System	DN 400 DN 420 Computational Nodes
Relative Performance[1]	40
Mips[2]	.72
Memory Size in Bytes (Minimum-Maximum)	512K-3.5M
Purchase Price[3] (Memory Size)	$39,000 (1M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	400
Channels (Minimum-Maximum)	1-6
Cache (Buffer) Size	4K
Bus Architecture?	No
Price per 1M Byte Of Main Memory	$7,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, power supply and the vendor's Domain local-area network.

CHARLES RIVER DATA SYSTEMS, INC.

Characteristics \ System	Universe 68
Relative Performance[1]	33
Mips[2]	.57
Memory Size in Bytes (Minimum-Maximum)	256K-6M
Purchase Price[3] (Memory Size)	$25,100 (256K)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	1,000
Channels (Minimum-Maximum)	1-6
Cache (Buffer) Size	None
Bus Architecture?	Yes
Price per 1M Byte Of Main Memory	$5,500

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, operating system, power supply and all prerequisites.

WANG LABORATORIES, INC.

Characteristics \ System	VS90	VS100
Relative Performance[1]	45	67
Mips[2]	.77	1.3
Memory Size in Bytes (Minimum-Maximum)	1M-4M	512K-8M
Purchase Price[3] (Memory Size)	$73,000 (1M)	$103,000 (1M)
Lease Price (Lease Term)	$2,920 (5 Year)	$4,233 (5 Year)
Machine Cycle Time (Nsec)	480	480
Channels (Minimum-Maximum)	Not Available	Not Available
Cache (Buffer) Size	None	32K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	$16,000	$16,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

MICRODATA CORP.

Characteristics \ System	Sequel
Relative Performance[1]	30
Mips[2]	.54
Memory Size in Bytes (Minimum-Maximum)	1M-2M
Purchase Price[3] (Memory Size)	$163,275 (1M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	600
Channels (Minimum-Maximum)	127
Cache (Buffer) Size	None
Bus Architecture?	Yes
Price per 1M Byte Of Main Memory	$163,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor, a 16M-byte tape subsystem, a 257.4M-byte disk subsystem, four terminals and eight I/O ports.

GOULD, INC. SEL COMPUTER SYSTEMS DIVISION

Characteristics \ System	Concept 32/8705	Concept 32/8750	Concept 32/8780
Relative Performance[1]	144	144	259
Mips[2]	2.6	2.6	5.4
Memory Size in Bytes (Minimum-Maximum)	1M-16M	1M-16M	1M-16M
Purchase Price[3] (Memory Size)	$260,000 (2M)	$295,000 (2M)	$330,000 (2M)
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	75	75	75
Channels[4] (Minimum-Maximum)	0-38	0-38	0-38
Cache (Buffer) Size	32K-64K	32K-128K	64K-128K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$16,500	$16,500	$16,500

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor, 2M bytes of main memory, 80M bytes of disk storage, a tape unit and systems software.
4. In the chassis configuration there are 38 I/O slots available. Twenty-one are reserved for the processor. The balance can be used for other devices such as memory. In the basic 2M configuration, 14 slots are available for high-speed I/O device controllers; I/O processors can attach to any one of those slots. Up to four I/O processors can be attached to a single processor. Those devices can handle additional devices, the vendor said.

FORMATION, INC.

Characteristics \ System	F4000 Model 100	F4000 Model 200	F4000[4] Model 200AP	F4000[5] Model 300	F4000[5] Model 300AP
Relative Performance[1]	12	14	20	16	22
Mips[2]	.20	.32	.36	.24	.38
Memory Size in Bytes (Minimum-Maximum)	256K-8M	256K-8M	256K-8M	256K-8M	256K-8M
Purchase Price[3] (Memory Size)	$60,200 (1M)	$73,200 (1M)	$105,700 (1M)	$120,200 (2M)	$150,400 (2M)
Lease Price (Lease Term)	None	None	None	None	None
Machine Cycle Time (Nsec)	800	800	800	800	800
Channels (Minimum-Maximum)	0-4	0-4	0-4	0-4	0-4
Cache (Buffer) Size	None	None	None	None	None
Bus Architecture?	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$13,200	$13,220	$13,220	$13,220	$13,220

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2. CW estimates.
3. For the processor and main memory only.
4. The firm's Model 200 attached processor operates only under IBM's VM/370 operating system.
5. Model 300 processors feature fail-soft capabilities, the vendor said.

COMPUTER DESIGN SYSTEMS, INC.

Characteristics \ System	Advisor 32/60	Advisor 32/80
Relative Performance[1]	198	475[5]
Mips[2]	4.2	14.6
Memory Size in Bytes (Minimum-Maximum)	256K-6M	256K-8M
Purchase Price[3] (Memory Size)	$290,000 (1M)	$290,000 (1M)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	125[4]	125[4]
Channels (Minimum-Maximum)	16-128	16-128
Cache (Buffer) Size	256K	256K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	$62,000	$62,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.
4. A performance enhancement feature is available which reduces the machine cycle time to 75 nsec.
5. The 32/80 processor is available with an 80M-byte, 50 nsec read-only memory which reportedly enhances performance.

The Superminis

DATA GENERAL CORP.

System / Characteristics	MV/6000	MV/8000
Relative Performance[1]	60	60
Mips[2]	1.06	1.06
Memory Size in Bytes (Minimum-Maximum)	1M-4M	1M-12M
Purchase Price[3] (Memory Size)	$74,000 (1M)	$179,000
Lease Price (Lease Term)	Not Available	Not Available
Machine Cycle Time (Nsec)	110	110
Channels (Minimum-Maximum)	2	2
Cache (Buffer) Size	16K	16K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	$8,000	$8,000

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2. CW estimates.
3. For the processor only.

BTI COMPUTER SYSTEMS

System / Characteristics	BTI 8000
Relative Performance[1]	35
Mips[2]	.59
Memory Size in Bytes (Minimum-Maximum)	512K-16M
Purchase Price[3] (Memory Size)	$150,000 (2M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	667
Channels (Minimum-Maximum)	432
Cache (Buffer) Size	None
Bus Architecture?	Yes
Price per 1M Byte Of Main Memory	$75,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For a 2M-byte processor including power supply and all prerequisites.

STRATUS COMPUTER, INC.

System / Characteristics	Stratus/32
Relative Performance[1]	5
Mips[2]	.05
Memory Size in Bytes (Minimum-Maximum)	2M-8M
Purchase Price[3] (Memory Size)	$123,250 (2M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	125
Channels (Minimum-Maximum)	2-14
Cache (Buffer) Size	None
Bus Architecture?	Yes
Price per 1M Byte Of Main Memory	$10,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

HARRIS CORP.

System / Characteristics	Harris 80	Harris 100	Harris 300	Harris 500	Harris 800
Relative Performance[1]	36	36	44	50	84
Mips[2]	.6	.6	.76	.88	1.46
Memory Size in Bytes (Minimum-Maximum)	768K	768K	768K-3M	768K-3M	768K-12M
Purchase Price[3] (Memory Size)	$44,950 (768K)	$55,000 (768K)	$74,950 (3M)	$106,600 (3M)	$172,900 (12M)
Lease Price (Lease Term)	Not Available	Not Available	Not Available	Not Available	Not Available
Machine Cycle Time (Nsec)	300	300	300	300	180
Channels (Minimum-Maximum)	24	24	24	24	31
Cache (Buffer) Size	None	None	6K	6K	6K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$13,000	$13,000	$13,000	$13,000	$13,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

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System / Characteristics	HP 3000 40	HP 3000 44	HP 3000 64
Relative Performance[1]	32	32	64
Mips[2]	.56	.56	1.1
Memory Size in Bytes (Minimum-Maximum)	256K-2M	1M-4M	2M-8M
Purchase Price[3] (Memory Size)	$85,000 (512K)	$178,575 (4M)	$380,000 (4M)
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	105	105	75
Channels (Minimum-Maximum)	3-10	3-24	3-24
Cache (Buffer) Size	None	None	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$16,000	$16,000	$16,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
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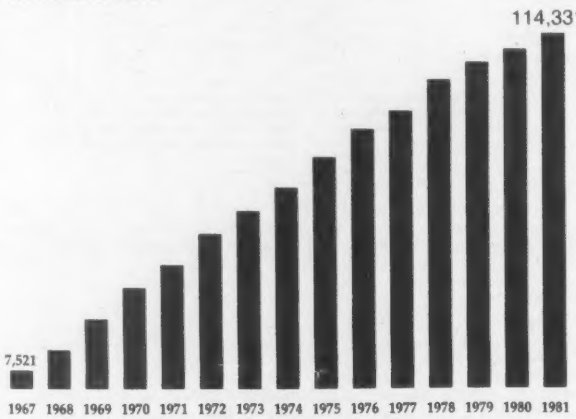
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LONG-RANGE MIS PLANNING

BY LARRY LONG

A COMPREHENSIVE LONG-RANGE MIS plan focuses attention on all areas that affect information services.

MIS planners and advisers can use a planning matrix as an aid to developing strategies for each major planning area. The matrix encourages a structured approach that reduces the complex MIS planning process to intelligible and manageable modules. The planning matrix discussed in Part 2 of this series (Activity 5) can be used to ensure that "all bases have been covered."

In most organizations, comprehensive coverage would address the following areas: policy, information systems, hardware, systems software, MIS structural organization, personnel, management, operations, standardization of documentation and procedures, productivity improvement, facilities, contingency planning, social impact and legal implications, MIS image, and word processing and office automation.

PART 3: Planning Strategies.

Part 1 of this three-part series demonstrated the need, benefits, objectives, scope, state of the art and pitfalls of MIS long-range planning. Last week, Part 2 presented the activities of a three-phase MIS long-range planning methodology. This final installment focuses on specific planning strategies.

This three-part series is based on Larry Long's most recent book, Design and Strategy for Corporate Information Services: MIS Long-Range Planning, *Prentice-Hall, Inc. 1982. The book, which costs $25, may be ordered through Steven T. Landis, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.*

Other areas — for example, R&D — might be added, depending on organization type.

Policy

The planning process challenges the information services management team to assess the department's success under existing policy, operational standards and procedures. Some companies operate under implied policies. This is fine as long as no one contests the validity or applicability of a particular policy. Information services policy should be written and approved by appropriate authorities (a high-level information services steering committee).

Good policy is directly applicable to common situations and indirectly applicable to unusual situations. By establishing guidelines for most common situations, an MIS policy will establish a framework by which managers can bet-



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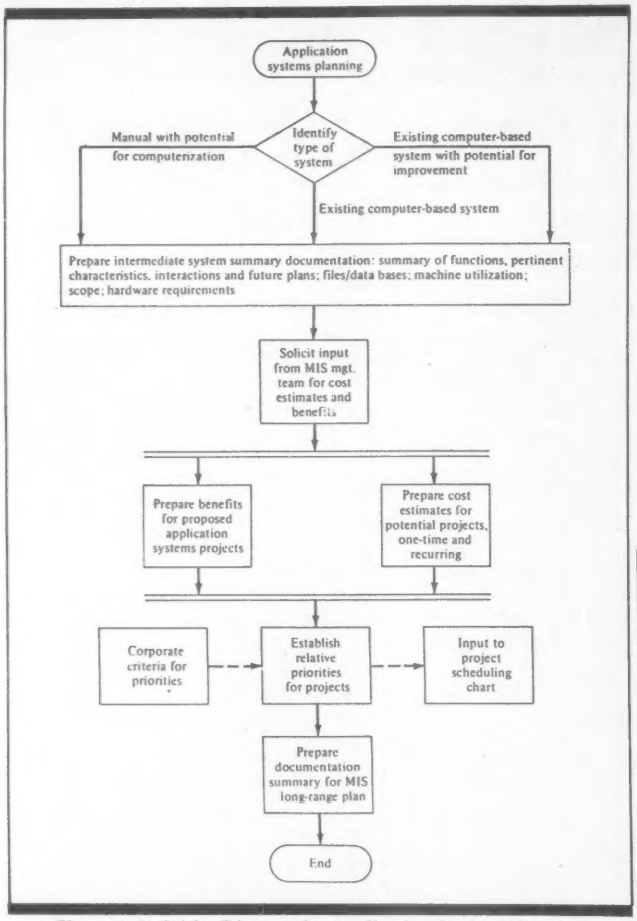


Figure 1. Activities Diagram for Application Systems Planning

ter cope with exceptional situations. The absence of policy leaves the door open for people to make their own interpretation of MIS policy. The following sections identify areas in which policy should be established.

• *Personal information.* Personal information should be controlled on a "need-to-know" basis. Policy on disclosure would reference when, to whom and how often personal information is released within the company and externally.

• *MIS charter.* Very few computer centers have an explicitly stated charter that details the center's role and responsibilities. Since MIS must be responsible to all segments of the organization, an MIS charter is critical. A charter can be used to identify responsibilities for such areas as input/output control, hardware acquisition, data base integration, telecommunications, office automation and/or word processing, feasibility studies and application systems development.

• *High-level MIS steering committee.* The high-level MIS steering committee (referred to as the information systems policy committee, or ISPC, in this series) has been a popular addition to many organizations during the last decade. However, many of these committees were founded without a charge and their members waste enormous amounts of time. To establish a charge, the organization's policymakers must decide on the committee's responsibilities, membership, meeting frequency and scope of involvement.

• *User service requests.* The service request is both the catalyst to MIS activities and their undoing. The policy on content, routing procedures and approval authority of service requests must be clearly defined.

• *Chargeback system.* Chargeback systems are implemented to encourage judicious utilization of information services resources. A person or department is always more deliberate

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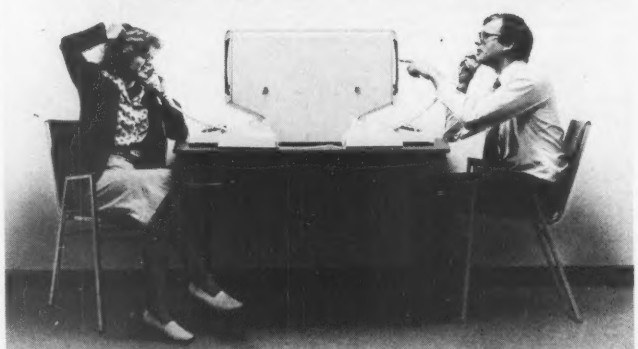
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when spending his (or its) money rather than someone else's.

• *Hardware acquisition.* The existence of a hardware acquisition policy eliminates the need for corporate and information services managers to debate the merits of the various acquisition alternatives every time a major hardware acquisition takes place. A serious problem now facing some organizations is uncontrolled decentralization.

Application Systems

Each facet of the MIS long-range plan has far-reaching effects on all phases of corporate endeavor. But the driving force and common thread of strategic MIS long-range planning is application systems planning. Virtually all other facets of the MIS plan are in some way affected by application systems planning (also called business systems planning).

Redundant, autonomous data processing systems are commonplace. Collection and dissemination of valuable information for managerial decision making become difficult, if not impossible. The central theme in application systems planning should be integration.

The application systems planning process provides insight for a better understanding of corporate operation. The knowledge and documentation compiled by those involved in the planning effort can provide valuable input to corporate managers whose scope of responsibility spans the gamut of corporate operations. Figure 1 illustrates the activities for application systems planning, which are discussed below.

• *Systems identification.* The purpose of this activity is to identify all existing automated systems, manual systems with potential for automation and automated systems with potential for improvement and/or integration with other systems.

In order to obtain a good understanding of existing and proposed systems, the following *intermediate system summary documentation package* should be compiled for each existing manual and proposed system: (1) a brief summary that includes a discussion of the system's basic functions, pertinent system characteristics or features, identification of other systems with which this system does or should interact and any future plans for enhancements or changes; (2) identification of file types, sizes and storage media (should be related to an integrated data base when appropriate); (3) relative scope of the present or proposed automated system; and (4) equipment requirements if equipment is a significant feature.

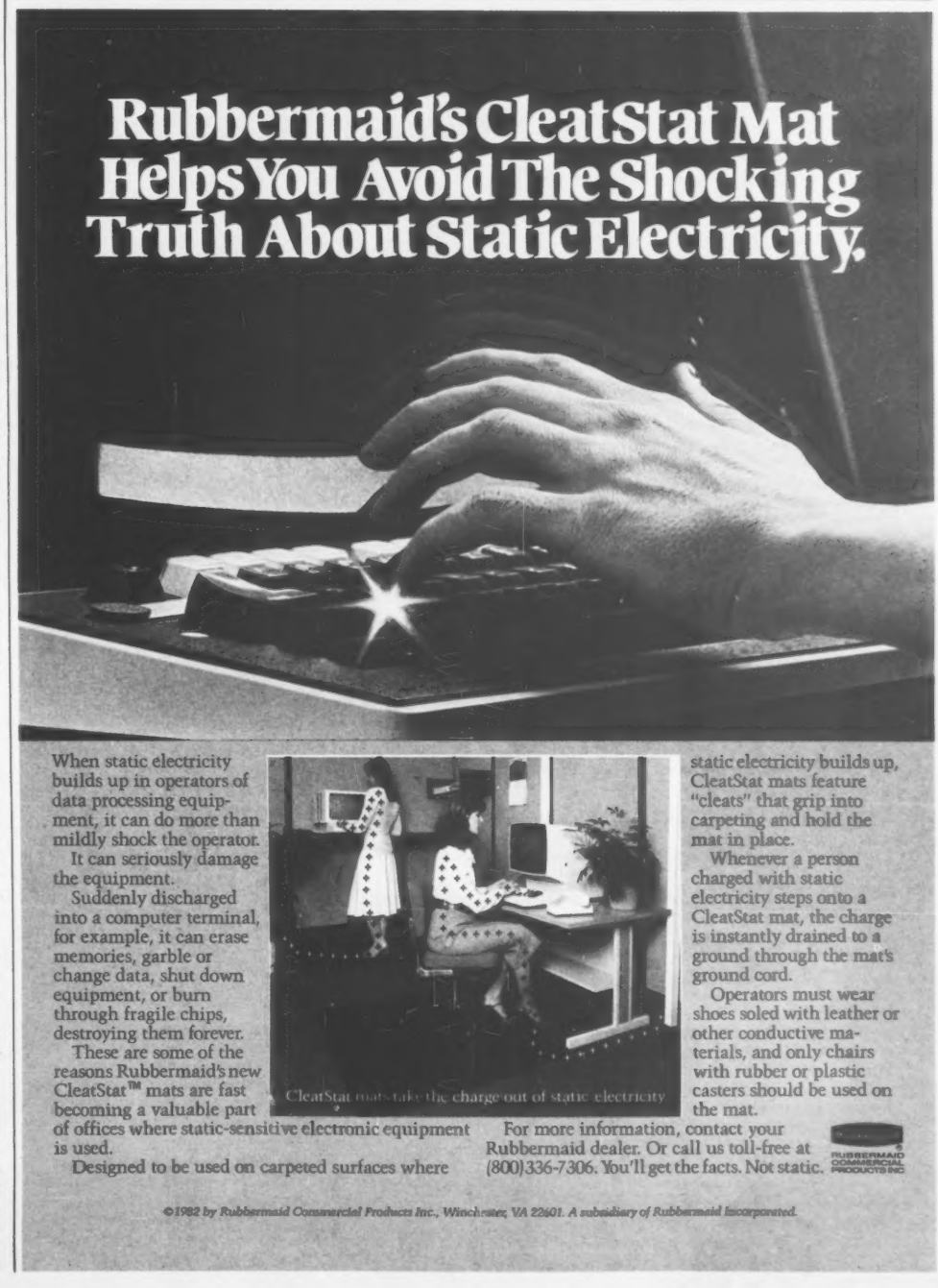
The primary input for documenting the existing manual and proposed systems is the documentation for existing computer-based systems, service requests, the list of approved projects compiled by the information systems policy committee and the recommendations from periodic system reviews. After this documentation is compiled, the task of assigning priorities and suggesting areas of integration will be easier.

• *Expected benefits.* As information services departments mature, fewer systems are justified solely on tangible benefits. The scope of information services has transcended basic transaction handling and personnel reduction. Now, systems can also provide insight into the decision-making process. Often, the benefits of this type of system are not reflected in direct or indirect savings in personnel and/or resources.

Some corporations have elected to associate dollar savings (or earnings) with certain intangible benefits to prepare a cost/benefit ratio and/or a rate-of-return analysis. In most cases, the dollar figures assigned to the intangible benefits are wild guesses. Therefore, cost/benefit and rate-of-return analysis for systems with many intangible benefits should be tempered with a certain amount of subjective evaluation.

• *Cost estimation.* Cost estimates prior to a comprehensive feasibility study are ballpark figures based primarily on a concept, not a design.

Two cost estimates should be made for each system under development or planned for development: one for the one-time cost of systems development and implementation, and the other an estimate of recurring cost for production and ongoing maintenance over the system's life. The latter cost



IN DEPTH

should be an estimate of yearly recurring costs. (See Activity 11 of the planning methodology presented in Part 2 of this series for a recommended procedure for cost estimates.)

• *System priorities.* Existing and potential information systems must be given a relative priority for development and implementation.

In setting system priorities, most corporations will consider the following: cash flow, interdependencies of the various systems, return on investment, consistency with corporate planning objectives and government regulations.

• *System documentation.* A subset of the previously compiled intermediate system documentation package should be included in the MIS long-range plan. The intermediate documentation was compiled for the purpose of making cost estimates and setting priorities. Within the text of the MIS long-range plan, each existing and proposed system should have the following documentation:

1. A brief overview of the proposed project (no more than two paragraphs).
2. Cost estimates with breakdowns into very general categories. (The categories should be the same for all systems.)
3. A summary of tangible benefits using dollars as a common denominator and a brief explanation of major intangible benefits.
4. A proposed priority position relative to other systems projects.

To illustrate the interaction between systems, an *overview corporate information flow diagram* can be included. Such a diagram can be used to illustrate data and work-flow interactions between all major systems of the corporation. The diagram should not be limited to computer-based systems, because existing manual systems are often prime candidates for computerization and often interact with computer-based systems. The corporate information flow diagram can be used to designate manual and computer-based systems, systems being developed, systems planned for development or the extent to which a system is computerized. In addition, priority for development can be indicated on the chart.

In summary, the documentation directly related to application systems planning that should be included in the MIS long-range plan is an overview of each system that includes a description, cost/benefit analysis, recommended relative priority and perhaps a suggested implementation schedule for each information system. Coupled with this overview should be a corporate information-flow diagram that illustrates the relationships between various corporate systems and the computerization status of each.

This documentation provides a foundation for planning in the other areas that support application systems planning (hardware, personnel, facilities and so on).

Hardware

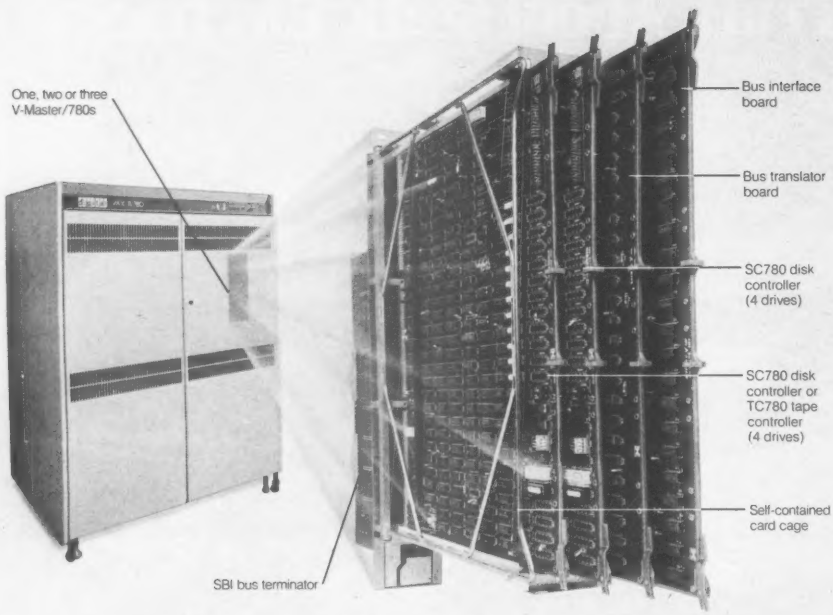
Data communications is playing a greater role in information systems; therefore, the hardware planning traditionally confined to a central facility is now expanded to include communications equipment, communications links, remote computers and remote I/O devices.

Data communications technology has made possible distributed data processing (DDP), which encourages the decentralization of computing hardware. Decentralization requires closer control of hardware acquisition in order to maintain compatibility, thereby making short- and long-term hardware planning essential.

The availability of relatively inexpensive small computer systems has prompted many user managers to purchase computers to support systems within their realm of responsibility. Word processing hardware has been upgraded to the point that such systems are no longer limited to text editing. Many have data retrieval and manipulation capabilities and can perform some basic DP functions.

If not coordinated, the proliferation of small computers and word processing systems can lead to compatibility problems and redundancy in the corporate data base. Hardware planning is a vehicle by which to avoid this problem.

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LONG-RANGE PLANNING – PART 3

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When hardware planning precedes information systems planning (and it does in many corporations), systems must be developed to accommodate available hardware. Systems development is difficult enough without placing unnecessary hardware constraints on developers. Hardware planning is based on historical utilization statistics and the capacity requirements of proposed information systems. The end product is a configuration of all corporate computer systems, both now and over the horizon of the MIS long-range plan.

Computing hardware can consume as much as 50% of the MIS budget and from .3% to 3% of the total corporate budget. These figures highlight the significance of having a hardware evaluation and selection methodology that will consistently result in acquisition of the most appropriate computing hardware. Such a methodology not only provides input to the planning process, but is a method of implementing the hardware recommendations in the MIS long-range plan.

Systems Software

Applications software and systems software are distinctly different in source, concept and use. They are, therefore, presented as separate planning areas. Applications software is very dependent on specific systems software products. Systems software is dependent on applications software only in that there is an implied commitment to support applications software with specific systems software products.

The number and variety of systems software products is overwhelming. For any given organization to stay abreast of available products, it is recommended that two or three technical support specialists be assigned responsibility for keeping track of product announcements.

Systems software should be addressed in several categories so that the planner can develop a standard format for planning. Categorization permits the plan to be more easily updated from year to year. Possible categories include operating systems, data management, language support, utilities and performance measurement, communications interface and management and development tools.

MIS Structural Organization

Information services is a dynamic corporate function. As applications and computer hardware change, the information services function must be periodically reorganized to accommodate new procedures, to develop specialty expertise and to experiment with organizational alternatives.

• *Staffing.* Staffing involves estimating and allocating personnel to the projects and ongoing activities detailed in the MIS long-range plan. Estimated personnel requirements determined during application systems planning provide input into staffing considerations.

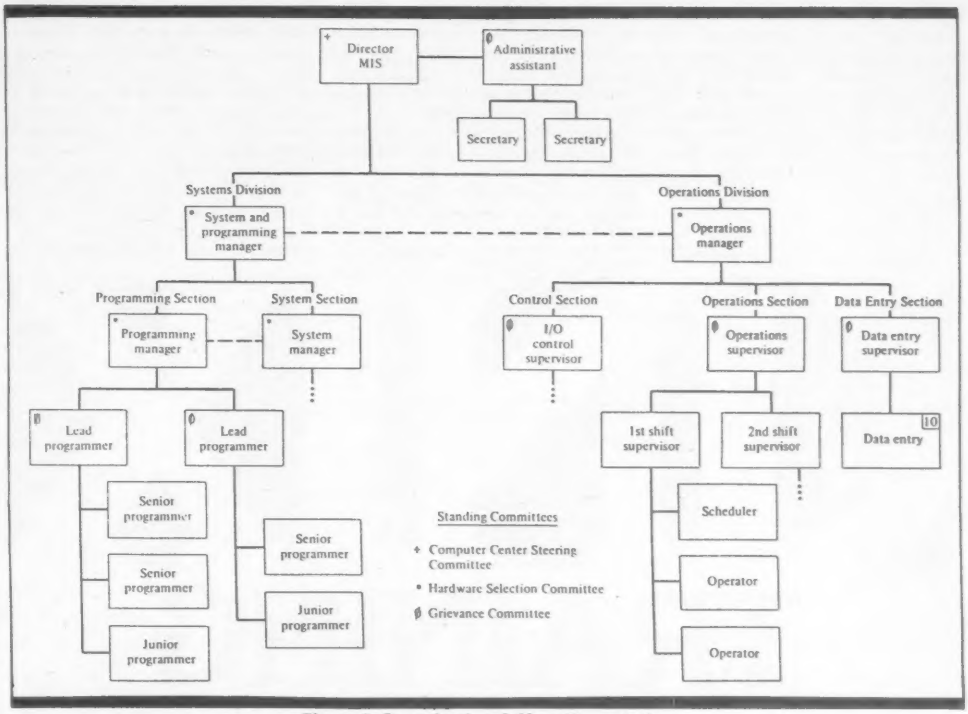


Figure 2. Organizational Chart Presentation

• *Structural organization.* The planner should work closely with MIS management and within the limitations of MIS policy and the information services charter to conduct a critical examination of the organization and any real or perceived flaws in its ability to serve the corporation.

The following aspects of structural organization should be examined: line and staff positions, individual or group titles, job functions, span of control, level of specialization, chain of command, committees and formal and informal communication channels. The examination should establish personnel duties, functional group associations and lines of authority.

The phenomenal growth of information services in budgeted dollars, scope of services and personnel has not been reflected in most corporate organizational structures. An information services department that does not have a position commensurate with its importance to the corporation is hampered in its ability to provide quality service. This is particularly true when the department does not hold a neutral position within the corporation.

• *Position descriptions.* Like organizational charts, formal position descriptions are often neglected and become dated. No professional discipline has a more volatile set of career paths than information services.

• *MIS committees.* MIS committees are of two types: standing and ad hoc. They serve to complement both the MIS organizational structure and the procedures required for MIS operations. Possible committees are: high-level MIS steering committee, library committee (stocks and maintains library), hardware selection committee, software selection committee, project steering and review committee, grievance committee, user committee and MIS long-range planning committee.

• *The organizational chart.* Figure 2 illustrates the *mechanics* of presenting an organizational chart. It is *not* a recommended approach to information services organization.

Personnel

The most serious problem facing MIS managers is probably the most basic and certainly the most neglected: personnel. The current seller's market in the information processing field is expected to persist for the next decade. Information services and functional area management will continue to have problems recruiting and retaining information services professionals. The successful MIS long-range plan will address these issues by focusing on person-

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nel-related topics such as morale, education, career development and salary administration. Much can be done to improve productivity, the environment in general and the plight of MIS personnel. If personnel issues are not included in the MIS long-range plan, they will be overlooked or put off indefinitely.

Management

Since the first commercial computer was installed in the U.S. Bureau of Census in 1951, information services professionals have been more adept at solving technical problems than managerial ones. The lack of managerial expertise and interest still exists, but to a lesser extent.

However, management is still one of the most pressing problems facing information services. Over the last decade, the personnel shortage has been especially acute for information services managers.

The lack of capable managers and the unwillingness of primarily technical people to move into management are only part of the problem. Many information services managers use the seat-of-the-pants approach to management. Like programming, management requires highly developed skills and use of the latest technology to be effective. Management tools can be a significant aid and should not be overlooked in the planning process.

Possible tools for management of the information services function include a project management and control system, productivity measurement techniques, a performance evaluation system and a management reporting system.

Operations

The fundamental object of operations planning is to schedule production information systems so that they utilize computing hardware to best advantage while meeting production deadlines.

The MIS planner becomes involved in operations planning primarily in the areas of staffing and general scheduling. Most decisions regarding information services have some effect on operations. The planner must interact continually with operations managers to ensure that their input is integrated in the MIS long-range plan.

Standards For Documentation And Procedures

Standardization in the area of information processing is a prerequisite to corporate integration. A variety of standardized procedures and conventions must be developed and implemented. The corporate data base must be standardized. In order to maintain hardware compatibility, guidelines must be developed for the purchase of small computer and word processing systems. For ease of documentation maintenance, the contents and format of system documentation should be standardized.

The planner should assess the need for establishing (or revising) procedures on service requests, employee performance evaluation and merit salary administration, application system reviews, the system development methodology, preventive maintenance for hardware, grievance and MIS long-range planning.

Productivity Improvement

MIS management must take direct action to improve productivity. The following have proved successful for some organizations:

- Use of standardized methodology.
- More responsive structural organization.
- Collection of data at the source.
- Use of high-level user-oriented languages.
- Improvements to existing information systems.
- Improved user interaction.
- Use of chargeback systems.
- Technology transfer.
- Introduction of data base management systems.
- Comprehensive education and career development programs.
- Better work place design.
- Opportunities for exercise.

Facilities

The MIS long-range planner should assess the adequacy of the MIS physical facilities. Common

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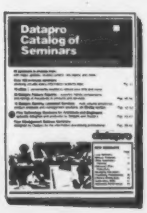
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SSFA CW 8/2

IN DEPTH

shortcomings include poor machine room layout, no controlled distribution center for I/O, lax security at the central and remote sites, poor location for backup data storage facilities (they should not be in the same building) and dispersal of information services personnel throughout one or several buildings.

Contingency Planning

The contingency plan is actually a series of plans for each type of occurrence that might disrupt the information services operation. Disruptions can be caused by individual or group negligence, an environmental disaster or emergency corporate or government requirements. Contingency planning also encompasses planning for extraordinary occurrences.

The corporation unprepared for other than routine operation is courting disaster. Some managers have discovered too late that "rarely" is not the same as "never." Corporations have gone bankrupt because of the computer center's inability to recover from a disaster and/or provide continuing services.

A *contingency planning team* should meet periodically to develop contingency plans and revise them as needed. The contingency planning team would involve personnel with a direct interest in operations (user and information services), systems analysis, systems programming, applications programming, internal auditing, legal ramifications, security, data communications, management of information services, building maintenance, fire protection, transportation and insurance adjustment.

Social Impact And Legal Ramifications

MIS management must analyze the social impact of the company's current and proposed information systems. The assessment is made in cooperation with appropriate functional area managers. The social impact can be internal and/or external and ranges from employees' short-term displeasure with new procedures to employee displacement.

If guidelines do not exist, the planner might suggest that they be developed such that applications systems will remain within the bounds of any applicable law.

MIS Image

Since the information services department caters to most other operational entities in the corporation, information services has become the workhorse and the whipping boy. It is the rare department that does not have image problems.

Any organization should maintain good relations with its clients. In the case of information services, the clients are the user departments. Most companies have a public relations office to create and maintain a positive corporate image. The public relations function should also exist within information services.

The following may help improve the department's image:

- Name change.
- User seminars.
- More responsive procedures.
- A move to a more appropriate level within the organization.
- Elimination of overcommitments.
- User liaisons.
- User incorporation into the systems development methodology.
- Better product quality.

Office Automation And Word Processing

The scope and meaning of the terms "office automation" and "word processing" have been a source of confusion to information services personnel, user managers and clerical personnel.

Office automation includes such applications as word processing, data processing, data entry, electronic mail, facsimile and voice processing. In reality, office automation is simply another application for computer-based systems. The terms were coined to sell stand-alone hardware to support office automation, but word processing and office automation are simply extensions of the information services function.

Office automation is a good and cost-justifiable application of computers, but it is oversold (by ven-

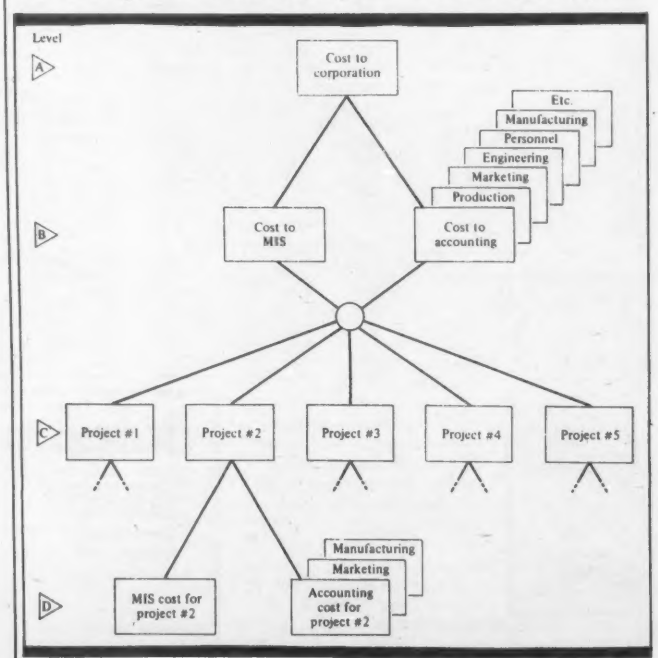


Figure 3. Hierarchy of Cost Summaries

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EASTERN

IN DEPTH

dors), undersold (by information services departments) and missold (by all) to functional area managers. For these reasons, and because office automation is an extension of the information services function, office automation should be an integral part of the MIS long-range plan.

Some have advocated that special "office administration" groups be set up to control office automation. This is, at best, a short-term, perhaps even counterproductive approach. As word processing and office automation become ubiquitous, each workstation should be integrated into the corporate computer network. Any organizational structure that promotes stand-alone word processing systems will be in direct conflict with the information resource management (IRM) concept.

The key to successful corporate-wide implementation of word processing and office automation applications is to concentrate initial efforts on one office and make it a success. In no other computer-based application is resistance to change more acute. Wholesale implementation of word processing can result not only in failure, but chaos. The pilot department should be selected on the basis of visibility, probability of success and potential for recognizable economic benefits.

Cost

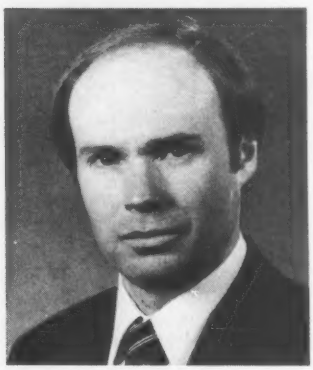
An MIS long-range plan provides sufficient information to make rough estimates of certain project and operational costs. A cost summary will prove helpful in defining budget requirements over the planning horizon; however, a section on costs is not necessarily essential for a comprehensive MIS long-range plan. In fact, there is some danger in making cost estimates based on limited information. But as long as the cost summary is recognized as an accumulation of rough estimates for long-range budget planning, a summary of cost can be safely included.

For clarity, costs should be summarized within the context of a minimum of cost categories such as labor, travel and so on. In addition, costs are further categorized as one-time or recurring.

A *hierarchy of cost summaries* (Figure 3) allows managers to extract cost data more easily. Levels A and B of the hierarchy present cost summaries without regard to a particular project. Levels C and D summarize costs by project. At level D, costs are summarized by project, by budget center.

In summary, strategic planning can not only create a better working environment for users and MIS personnel but also contribute significantly to corporate objectives.

MIS long-range planning will never be easy. It requires a commitment of support and cooperation from all corners and levels of corporate endeavor. But in the long run, information services and the functional area departments would be hard pressed to find a more cost-effective investment opportunity.



About the Author

Larry E. Long is a lecturer, writer and consultant in the field of information systems. He has presented a variety of professional MIS seminars in the U.S. and abroad.

Long's "Turnaround Time" column appears in Computerworld. *He has written books on MIS strategic planning, documentation and information resource management for end users and is in the process of compiling a two-volume book on management of the information services function.*

Long is an associate professor at Lehigh University and president of Long and Associates, Bethlehem, Pa.‡

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CW8/2

EDITORIAL

Is Stress the Culprit?

The recent spate of miscarriages, abnormal births and other health problems experienced by Canadian office workers who use CRT screens has rightfully evoked widespread concern on the subject.

In briefs submitted to a government-sponsored traveling task force on microelectronics, The British Columbia Hospital Employees Union reported health problems at four of that province's hospitals [CW, July 19]. Testifying before the same task force in Montreal, the Canadian Business Equipment Manufacturers Association submitted that its member companies produce CRT terminals that meet or exceed national and international safety standards.

Radiation emitted by CRTs is the chief cause for concern among users. However, in at least a dozen surveys, the U.S. National Institute for Occupational Safety and Health (Niosh) has found no scientific evidence linking CRT radiation to health hazards of any kind [CW, July 26].

But reassurances have done little to dispel the fears of women office workers who have endured the anguish of miscarriages and birth defects. What they must consider, though, is the fact that thousands of pregnancies end in miscarriages and babies with birth defects for all categories of women the world over every year.

The Canadian CRT users can argue that it seems highly unlikely that the British Columbia complaints are just one big coincidence. Maybe they aren't, but perhaps it is time to take the investigative spotlight off radiation and shine it on another target — management. It is management that governs how office workers interact with CRTs and it is managers' responsibility to ensure that interaction is planned intelligently.

Overexposure to CRTs can lead to stress in the form of headaches and eyestrain, both of which were reported by the British Columbia hospital workers. Niosh admits that stress could be a factor in pre- and postnatal problems.

Innovative employers are finding ways to regulate CRT exposure and maintain office productivity. It is time for *all* employers with CRT terminals to follow their lead.



Disk Drive Vendor Blames Manhattan Skyscrapers for RFI Problems (News Item)

DATA PAST

Five Years Ago
Aug. 1, 1977

NEW YORK — Two copy editors who worked for *The New York Times* were diagnosed as having cataracts after the newspaper switched to electronic editing and typesetting.

The Newspaper Guild of New York AFL-CIO asked the Manhattan Federal District Court to grant a temporary restraining order to take the two editors off the CRTs until new tests could be done.

— — —

WASHINGTON, D.C. — The final version of a General Accounting Office report on the Veterans Administration's proposed Target system suggested Congress erred in its decision to fund the controversial computerized claims-processsing system for 1978.

Ten Years Ago
Aug. 2, 1972

OMAHA, Neb. — Although one court had barred IBM from making a new product announcement, it was overruled on IBM appeal.

IBM then announced two new models in the 370 series — the 158 and 168 — with virtual storage and four new programming systems.

— — —

DENVER — A computer operator was arrested and charged with short-circuiting a computer system at least 56 times in two years.

Before the arrest, however, the user and the computer manufacturer (Burroughs Corp.) spent an estimated $500,000 trying to track down what was assumed to be a problem in the machine or the power lines coming into the company.

LETTERS

DES Clarifications

A rather lengthy letter to the editor [CW, July 12] put forth some rather confident assertions that I "made a couple of serious mistakes that needed to be corrected" in my In Depth article, "DES: Putting It to Work" [CW, June 21].

The criticisms are simply not true.

William B. Adams stated in his letter that I was wrong in asserting that when the Data Encryption Standard (DES) is used as a random number generator, it is impossible to break ciphertext by frequency analysis. If Adams had read more carefully, he would have seen that I defined a specific case where this is true: when DES is used in Output Feedback (OFB) mode with continual redefinition using the *same* initialization vector and key at regular and small intervals. It is well known that this produces a cipher called an "interrupted Vernam system" and frequency analysis is one of the major, if not the only, tool for breaking this insecure cipher.

Adams also misinterpreted my statements about how DES can aid in communications error detection. I agree with him that when state-of-the-art error-checking procedures are employed, there is virtually no chance of errors going undetected, regardless of the nature of the message. But with simpler, more common procedures, such as single bit parity checks, there is a significant probability that errors go undetected. In this case, DES can aid in detecting errors after the supposedly "error-free" reception. And, as I went to great lengths to point out, DES magnifies this error enormously by making a single bit error in ciphertext propagate (in all but OFB mode) over at least 64 bits of cleartext.

As DES is used more extensively, it tends to be used over communications lines that have more simplistic error-checking techniques. The DES box used to protect information between a terminal and computer via the standard 8-bit-oriented modem is a noteworthy case. In addition, improper decryption of small data segments (such as automatic teller machine personal identification numbers) is often used as a flag to indicate communications errors and causes a request for retransmission.

Michael B. Schwartz
Prime Factors
Oakland, Calif.

An Explosive Issue

"Explosions Rock IBM Disk Plant" [CW, June 21] described magnesium as "highly explosive" and said that "magnesium explodes when mixed with water." These statements are technically incorrect.

At normal room temperatures, magnesium metal and its alloys are as safe as any other structural metals. They do not explode upon contact with water. For example, beer cans are made of an alloy of aluminum and magnesium.

However, the storage and handling of most powdered materials requires proper safety procedures. Finely powdered metals, as produced from the grinding and fine machining of iron, as well as titanium and magnesium, can be ignited. If water is sprayed on burning metals, hydrogen is released by the decomposition of the water. Hydrogen in air can be ignited to burn with a blue flame or flash explosively.

Dust from flour mills can be explosive, too, but that doesn't mean that flour should be described as "highly explosive."

G.R. Couch
President
Amax Specialty Metals Corp.
Parsippany, N.J.

SOFTLINE/Werner L. Frank‡

Making Sense of CRT Terminology

Terminology associated with CRT terminals is confusing. Take, for example, the label "Ascii terminal." How does it differ from a teletypewriter (TTY) terminal and an IBM 3270 device?

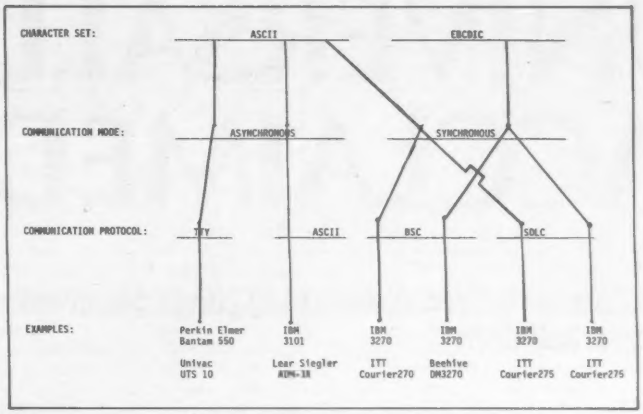
Ascii stands for American Standard Code for Information Interchange and includes two aspects: the 128 seven-bit character code set and the control and format procedures for transmitting strings of characters between two devices (the control characters defining the communications protocol).

This two-part meaning often leads to confusion. As shown in the topology of the figure on this page, Ascii-coded characters can be transmitted in any one of at least four different protocols. If one speaks of an "Ascii terminal," it is not always clear what total environment is intended.

The Ascii standard has been enhanced by the American National Standards Institute (Ansi) to include additional coded control functions to provide even more complex transmission facilities. Thus, one could speak of an Ansi-compatible terminal as well as an Ascii terminal. Unfortunately, these two labels are sometimes used interchangeably.

We define the Ascii terminal as a device operating in asynchronous communications mode, employing the Ascii character set and the Ascii transmission protocol. The Ascii terminal is thus distinguished from the TTY terminal by the communications protocol used.

The Ascii and TTY terminals are often called dumb terminals because of their limited or nonexistent logic. As more and more functions are offloaded from the computer and made part of the terminal facilities, these devices become smart terminals. They acquire such capabilities as local editing, reverse video and half-intensity character presentations, blinking and blank fields, protected and unprotected screen areas, underline, automatic tabbing, multipage and scrolling and diagnostics.



The CRT Terminal Topology

Enter the IBM 3270

Now we reach another issue of proper nomenclature. Can a character-mode terminal with a good set of associated functions and local logic be given the distinction of smartness, or is the term reserved for block-mode operations?

Of course, here the IBM 3270 system steps into this chronology. This system has introduced a major capability and unique architecture within the confines of display devices. The special coupling of terminal with controller leads to clustered topologies as well as divided functionality, but it does pose the question of where the terminal begins and ends.

It is perhaps best to single out the IBM 3275 packaging as the basis for our discussion so that adequate comparisons can be made. This terminal can accumulate a full screen of characters before sending them to the connected computer.

This leads to a major departure. Instead of the usual asynchronous communications protocol for transfer, the IBM standard, bisynchronous protocol, is used. This process can often be more efficient than sending a sequence of characters one at a time. Hence, block-mode screen treatment or, as it is sometimes called, full-screen mode is born. The 3270 system is also able to operate within IBM's Systems Network Architecture employing the Synchronous Data Link Control protocol.

Character mode and block mode deserve further distinction. The former can be viewed as one-dimensional screen usage, whereas the latter has attributes of two dimensions. Using the screen in character mode typically means incrementally adding strings of information, one line at a time. This leads to the popular screen scrolling function which, in essence, makes a screen serve as a unidirectional, endless recording device.

Block mode, on the other hand, gives a full screen presentation all at once and permits cursor-traversing of the full screen in any direction. With block mode, it is now possible to introduce the page, which is the equivalent of one full screen. Therefore, block mode facilitates the notion of paging — a process of moving backward and forward among sequentially related screens.

For the character or block modes of operation, the computer program will respond to the data transmitted from the terminal. In both cases, the appropriate screen entry data can be examined, validated and accepted, or error returns may be given.

Intelligent Terminals

There is a third mode, which I call field mode. Field mode is a variation of block mode distinguished by the occurrence of edit and validation operations for each field on the screen at the time of entry. Field mode is possible on certain smart terminals, but more than likely an intelligent terminal is required.

The distinguishing feature of intelligent terminals is programmable memory. The intelligent terminal knows where and when data is being placed on the screen and therefore can control the entry at time of event. One can achieve similar behavior with a smart terminal by requiring a special control key selection, signaling the computer to process any localized changes made to the screen. The intelligent terminal introduces a capability that is critical for performance of the device from an operator's point of view. This is the degree of responsiveness to screen changes, often called the process of screen generation.

There are three main generating schemes, ranging from slow to fast: character-by-character generating, block-mode filling up of a full screen refresh buffer and, the most rapid, mapping memory to the screen. The first two modes can operate either by the computer continually generating the data for display or via a dedicated buffer memory associated with the terminal itself. Memory mapping implies an intelligent terminal which, depending upon its features and external interface possibility, can range from a programmable terminal to a desktop workstation.

The difficulty of clarifying the terminology associated with CRT terminals is heightened by the number of different display devices — more than 1,000 offered by some 300 vendors. It is no wonder that the variety of features and capabilities defies classification. At best, we can only provide broad guidelines and work toward clearer understanding based on separating four fundamental concepts about these terminals: the nature of the screen presentation (mode), the communications control (protocol), physical characteristics of the device (functionality) and the degree of processing capability (logic).

Frank is executive vice-president of Informatics General Corp. in Woodland Hills, Calif.

HUMAN CONNECTION/Jack Stone‡

Simple Code Pays Off

This is Part 14 of a continuing series on how to succeed as a data center manager.

As DP managers continue their struggles to find better ways to manage programmers, I cannot understand why so many of them seem to overlook the more obvious areas of improvement.

Let's look at the particular issue of programming standards. One of the many management innovations that Stephen Roberts has introduced into his systems development group at Catholic University of America is a philosophy of Cobol standards based on this premise: Regardless of the programming strategies, methodologies or techniques used in an operational program, the program must be easily maintainable by a programmer with average experience and competence. Here is his reasoning:

"One of the most serious operational problems that can occur in a DP operation is the failure of a production program. DP managers dread these situations because the staff is forced to respond extremely quickly and effectively to avert disaster.

"Programs for the production environment should employ simple, if not rudimentary, techniques. We feel that the further the programmer is allowed to extend the code into frontiers of the technology, the more difficult and time-consuming it is to find answers to program problems. In our center, if programmers explore these frontiers, they do so by my direction or on their own time.

"The programming standards we use are derived from our ideas of maintainability. Here are the major ones:

"Code must be easy to read: There should be one statement per line, the paragraphs should be numbered sequentially and data names must be descriptive.

"COPYLIB, the library of file descriptions, should be employed.

"Comments should be used, but not excessively, as they can be distracting. They should, of course, describe the program's purpose and be used for areas of unusual code.

"There should be only one place in the program for a READ or WRITE statement per file being accessed.

"Nested IF statements should be used sparingly.

"No ALTER statements are allowed.

"PERFORMs should be employed wherever possible, and GOTOs may be used when appropriate.

"Finally, we don't mandate programming flowcharts in the documentation because they are not easily maintained.

"As a concluding note, we don't feel it's desirable to expend the resources to control code much beyond these guidelines. And, because code might have to be modified by any staff member in an emergency, peer pressures go a long way to ensure conformance with the standards."

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Relational Tools Aid DP Productivity Codd Tells Data Base '82 Attendees

By Lois Paul
CW Staff

TYNGSBORO, Mass. — The developer of the relational data base model addressed topics ranging from the productivity gains that are possible by using relational systems to future directions for the relational model at the recent Data Base '82 short course, sponsored by the Wang Institute here.

Dr. Edgar F. Codd of IBM's Research Laboratory in San Jose, Calif., (photo at left) told the approximately 100 attendees that relational systems can boost DP productivity because they provide data independence, structural simplicity and relational processing, which is less prone to maintenance problems.

"Data base management systems [DBMS] and data dictionaries have been highly successful as instruments for data control, but they have really failed as productivity boosters in general," Codd said.

He cited several reasons why systems based on the hierarchical and network models have fallen down on this point. One is that applications developers have been forced to cope with low-level structural detail, such as the Codasyl model's "owner-member set." He also noted that there has been no sharp distinction between the programmer's logical view of data and the physical view of the data in storage. Programmers have been required to navigate along access paths to reach the data, and this has slowed efforts both to develop and install application programs.

The relational model was developed to deal with some of these factors, Codd said. Its goals include data independence, which means a sharp and clear boundary between the logical and physical levels of data. It also was designed to foster communication between users and programmers by providing a simple model that both groups can under-

(Continued on Page 48)

Offers Software Solutions

Research Studies Space, Defense Problems

By Lois Paul
CW Staff

EL SEGUNDO, Calif. — When you are talking about space shuttle launches that carry price tags of between $50 and $100 million a shot, you want to be sure your software is going to work.

This task is one of the software program verification projects targeted for The Aerospace Corp. here, a nonprofit organization that primarily serves the federal government, particularly the Air Force Space Division.

Last year this organization established a sixth laboratory in computer science to carry out research that is applicable in a five- to 15-year time frame for space and defense problems.

Dr. Stephen Crocker, principal director of the organization's office of information sciences and research, explained that key areas in the research program include program verification and applications of artificial intelligence. The latter are intended to develop expert systems that will be useful in one aspect or another in space.

Interlisp Used

The program verification effort is written in Interlisp, a programming language primarily used for work in artificial intelligence.

The Aerospace Corp. originally was running its verification programs on a Digital Equipment Corp. Decsystem-20 minicomputer and on a DEC VAX-11/780. However, the VAX is a shared machine and Crocker recognized that when his department tackled substantial problems, it would require their own system if they were to avoid interfering with other peoples' work.

For that reason they brought in the Xerox 1100, a personal computer system developed by Xerox Corp. primarily for artificial intelligence use. The Xerox 1100 is used as a dedicated workstation, which was designed to facilitate a higher level of interaction between the user and the computer than that available via a time-shared computer system.

Crocker explained that this system was selected primarily because "we needed some fairly substantial computer power that is oriented toward Lisp." The Xerox 1100 supports Interlisp D, a Xerox-developed, upwardly compatible extension of Interlisp.

"The hardware revolution has just gotten to the point where it is sensible to put that level of computing power in front of a single person instead of trying to share it," he said. "If you want to run Interlisp it turns out that the Xerox product is the one to get right now."

The current application of the program-verification software involves microcode, which is being used on a BBN Computer Corp. computer to guard the flow of classified information in a military installation. "It becomes a question of whether or

(Continued on Page 50)

'ADC2' Fits MVS-Based Systems

LOS ALTOS HILLS, Calif. — The Cambridge Systems Group has introduced the Automated Data Center System (ADC2) to gather job and performance statistics in real time for facilities such as production jobs and IBM's CICS, IMS and TSO. The subsystem was developed for IBM and plug-compatible systems running under MVS.

The job scheduling and production data, as well as MVS system performance data, is automatically maintained by ADC2 for ready access and analysis by data center personnel, the vendor explained.

ACD2 reportedly builds a model schedule based on the processing calendar and job dependencies. The subsystem then monitors events happening within the system, reads in the model schedule and posts significant events that have occurred, such as step or job end.

ACD2 commands may be entered either at the master console or at any TSO terminal, the vendor said.

A single-site license for the package is available at the introductory price of $42,000. Discounts for smaller sites also are available, the vendor said from 24275 Elise, Los Altos Hills, Calif. 94022.

'VMLib' Aids VM/370 Environment

FALLS CHURCH, Va. — A source code management product for IBM's VM/370 environment has been released here by VM Software, Inc.

VMLib reportedly provides support for VM's Conversational Monitor System as well as for MVS, VS/1 and DOS operating systems running as a VM guest or in parallel with VM.

The product reportedly allows installation control and tracking of program changes and provides facilities to ensure that source code exactly corresponds with a specific version of production-mode object and load modules. A permanent record of each source program change is maintained and full program test management is an integral part of VMLib, according to the vendor.

This product has an introductory price of $3,000 for a permanent license received by Oct. 1, the vendor said from 7777 Leesburg Pike, P.O. Box 985, Vienna, Va. 22180.

Model 204, 'SAS' Link Bows

WASHINGTON, D.C. — An interface linking Computer Corp. of America's Model 204 data base management system (DBMS) and SAS Institute, Inc.'s Statistical Analysis System (SAS) has been developed by Decision Resources. Model 204 runs on IBM and plug-compatible mainframes.

The link to SAS gives Model 204 users extended statistical analysis and computer graphics capabilities. The interface, an SAS procedure called Proc M204SAS, reportedly enables users to access selectively SAS data in Model 204 data files.

A Model 204 dictionary or metadata file is utilized to provide the field attribute information necessary for the transfer.

The interface is priced between $7,000 and $15,000 for a perpetual license, Decision Resources said from 1701 K St. N.W., Third Floor, Washington, D.C. 20006.

PRODUCT UPDATE

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RP03	29-17681	$17 - $45
RP04	29-21276	$41 - $95
RP05/06	29-22086	$32 - $95

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RM03	9877	$330 - $410
RM05	9883-91	$765 - $950
RP02	9870-20	$265 - $330
RP03	9873-20	$265 - $330
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RM05	883-51	$2225 - $2650

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Codd Discusses Relational Tools

(Continued from Page 47)

stand and discuss.

Codd said that there have been questions regarding whether relational DBMS products provide the same services as hierarchical and network systems. These include a user-accessable catalog for data description, transaction support, recovery, concurrency control, authorization, integration with support for data communications, integrity and data storage, retrieval and update. "Relational systems support all of these, with some weakness in the last," he said. In addition, relational systems support dynamic change of data base description, improved immunity of application programs to data base change at logical and physical levels and a wider variety of user views.

"While the relational model is not yet applied to large data base systems, it is getting to several gigobytes and will be getting into larger and larger data bases," Codd said. "We have every reason to be optimistic about that."

Coexistence of Systems

In terms of the coexistence of relational and nonrelational systems, Codd said, "I think it will take years for those large data bases mounted on [IBM's] IMS and [Cullinane Database Systems, Inc.'s] IDMS to be migrated to relational systems, but that won't prevent introductions of huge numbers of relational systems. When they get them installed and see their productivity, they will look at their other systems and begin to wonder how they can migrate."

Among the short-term future directions for the relational model that he cited are implementations on microcomputers and minicomputers, improved integration support for larger systems, development of special hardware support and relational front ends grafted onto nonrelational systems.

When is a DBMS Really Relational?

TYNGSBORO, Mass. — Not every data base management system (DBMS) that calls itself relational is actually relational.

That was one of the messages Dr. Edgar F. Codd delivered to the approximately 100 attendees at Wang Institute's Data Base '82 short course held here recently.

"There has been a temptation for many vendors to call their systems relational," he said, noting that because of this it is necessary to reiterate the definition of a relational DBMS. According to Codd, a system is truly relational if it satisfies these requirements:

- Data is represented by tables without user-visible navigation links. The latter are handled "under the covers," he explained.
- A data sublanguage is supported that has relational processing capability (select, project and unrestricted join operators).

"If a system supports only one of the two, I would call it minimally relational," he said, noting that if it supports the first and not the second, it is tabular and does not have relational processing. If it supports neither one nor two, it is nonrelational.

Budget T/S Users Get IBM 3270 Emulation

MARINA DEL REY, Calif. — Budget Time-Share, Inc. has added a communications control system to its host system designed to allow its time-sharing customers to achieve full-screen processing functions from Ascii CRT terminals.

The remote time-sharing users can now get IBM 3270 emulation over regular telephone lines with existing equipment and dumb terminals, according to the vendor.

Budget is based at 4739 Alla Road, Marina Del Rey, Calif. 90291.

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Facility Gives Univac Users Simpler Access to Series 1100

BLUE BELL, Pa. — Sperry Univac has introduced the Interactive Processing Facility (IPF 1100), designed to provide users of its Series 1100 computers with simpler access to the system as well as versatility features intended to improve productivity.

IPF 1100 includes a consistent command language structured around key words. The vendor noted that abbreviations can be substituted for commands and key words. IPF 1100 also is said to be self-documenting, providing explanations of commands and errors.

Command words are categorized according to response time, magnitude of the task and other specified criteria, the vendor said, noting that scheduling techniques are used to ensure that the actual response time matches the target response time.

IPF uses 1100 Quota, a component designed to control system resources as well as to track the resources a user is allowed to use.

The IPF system is modular in structure to facilitate modification, Univac said. Its modules are IPF 1100 Control, IPF 1100 Command Language, Distributed Data Processing (DDP) 1100, IPF User Assistance, IPF Procedures and Edit 1100.

IPF Control reportedly includes the basic control structures and routines for use by other IPF software. The IPF 1100 Command Language is the user interface for directing the system. The vendor said it is based on the Codasyl common operating system command language specifications. DDP 1100 reportedly provides users with additional commands to copy files from one Series 1100 processor in a network to another. Jobs can be submitted and then executed on any 1100/60 or 1100/80 mainframe in the network.

IPF User Assistance is the module designed to provide on-line assistance to the user. IPF Procedures enables the user to build procedures that will provide additional power, the vendor explained. Edit 1100 provides commands for full screen and general editing.

In addition, IPF 1100 is said to provide access to a number of applications packages, including an industrial software package for manufacturing control, a financial accounting package, a financial and integrated accounting control system and a storage and retrieval package.

The IPF 1100 program products will be available in the third quarter of 1982. The monthly license fees for the IPF 1100 modules are:

- IPF Control — $1100 (1100/60), $200 (1100/80).
- IPF Command Language — $275 each for both modules.
- DDP 1100 — $100 each for both modules.
- IPF User Assistance — $75 each for both modules.
- IPF Procedures — $350 each for both modules.
- Edit 1100 — $290 each for both modules.

Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

HP 3000 Gets 'Opticalc/3000'

AUSTIN, Texas — Tymlabs Corp. has developed an electronic spreadsheet program for Hewlett-Packard Co. 3000 systems.

Opticalc/3000 reportedly features a 264-row by 63-col work sheet, the ability to run on all HP terminals, up to a 255K-byte memory for work sheet storage, over 100 built-in functions (including financial, trigonometric, statistical etc.), print command for fully formatted output to any device, conditional branching in calculations, edit formulas and labels and dynamic memory allocation for minimum impact on other terminal users.

The package sells for $3,500 from Tymlabs at 211 E. 7th St., Austin, Texas 78701.

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'Sysout' Bows For MVS Users

AGOURA, Calif. — Essential Software has announced Sysout, an archival and retrieval package for users of IBM's MVS operating system.

The package operates under IBM's System Productivity Facility (SPF) band and comes with SPF browse capabilities, including scrolling and the ability to find specific character strings, the vendor said.

The package costs $5,000, the vendor said from 6210 Feral St., Agoura, Calif. 91301.

Offers Application Menu

'Connews' Links 3270s, ACF/Vtam

LOS ALTOS, Calif. — Systems Network Analysis, Inc. has unveiled Connection News (Connews), a package that it said provides an interface connecting IBM 3270 terminals with IBM Advanced Communications Function (ACF)/Vtam application programs.

This interface reportedly allows terminal users to select from a menu of applications. The current status of the application is also shown in the menu. In addition, a set of terminal user functions and an electronic bulletin board are incorporated into the Connews screens, the vendor explained.

Using the standard ACF/Vtam controlling application facility, Connews is said to be the default application for all IBM 3270 terminals in a network. When Connews is executing and the terminal is not logged onto any other application, it is automatically logged onto Connews, the vendor explained.

All IBM 3270 keyboard/display models and their equivalent are supported in single or multidomain networks under all versions and releases of ACF/Vtam in an MVS or VS1 environment without any systems modifications.

Five-year licenses for Connews are available for $5,000/CPU and multiple CPU discounts are offered, the vendor said from 1300 Ensenada Way, Los Altos, Calif. 94022.

Presentation System Updates Goal's Phoenix Training Series

COLUMBUS, Ohio — The Phoenix Presentation System is a new version of the Phoenix System, a computer-based training series from Goal Systems International, Inc.

The original Phoenix System includes three modes — author, instructor and student, but to meet a growing demand for a system without an author segment, Goal is offering the Presentation System, a spokesman said.

The software runs on IBM 370, 30 series and 4300 series computers, as well as plug-compatibles under an OS environment, including VS1 and MVS; or in an VM environment with VS1 or MVS available. Installations can interface with Vtam, Tcam, Btam, CMS TSO and CICS, the vendor said.

Goal Systems has set a monthly lease fee for the Phoenix Presentation system at $395.

The company is located at The Goal Systems Building, 5455 N. High St., P.O. Box 29481, Columbus, Ohio 43229.

Aerospace Looks Toward AI Research

(Continued from Page 47)

not that computer is operating correctly," Crocker explained. "The verification we are trying to carry out is to try to assist in that assurance." He pointed out that it is not the only means the government will use to guarantee the correctness of its data. "It is an application of the research to see if it can be helpful in that area." Crocker's group still is researching its future direction in the artificial intelligence area. He explained that the general notion behind expert systems is to capture more knowledge than an experienced working expert has in a field, primarily regarding decision making in individual cases. The "expert system" is intended to absorb the rules which govern that person's decision making, studying their behavior until it has "soaked up their expertise," he added.

"Various studies on the degrees of expertise suggest that the top 10% of a population account for 30% of the productivity," Crocker said. "That means that between the best and the worst members of any given expertise, there may be as much as a 30 to 1 ratio in skill. So when you look at some of the labor-intensive areas, particularly at manpower in future military, critical skills become a key issue." Anything that can be done to automate that skill will be helpful, as people are in short supply, he noted.

Application Example

An example of the type of application they might pursue is to develop an expert system that could handle the interpretation of data that is returned via satellite.

Another area could be planning processes and the allocation of resources, such as deciding how to pack payloads into space shuttles. "People get experienced about it, and you may want to capture some of that," he said.

"The general theme in both the verification and the expert system areas is the idea that computers ought to participate more in the things that programmers do," Crocker said. "Programmers are in the business of automating everybody else's life and yet their own work is very labor-intensive. It is a bit of a shame that we don't have more intelligent tools that take on a greater burden."

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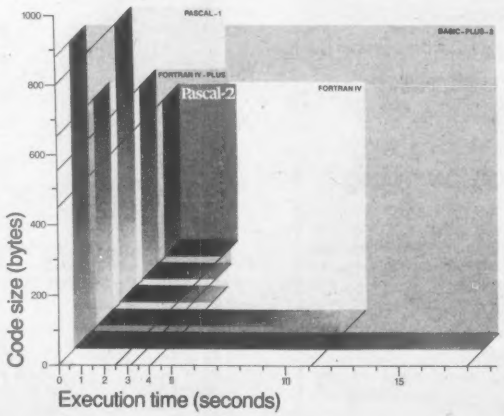
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Modeling Support Libraries Aid IMS, CICS Users

WALTHAM, Mass. — Modeling support libraries designed to assist capacity planners in modeling IBM IMS and CICS applications were announced here by BGS Systems, Inc.

Based on the firm's Crystal system development tool, Crystal/IMS and Crystal/CICS reportedly include path lengths (processing times) of IMS and CICS service routines. The libraries are accessed by Crystal, which generates a model for computing response time, throughput and device utilization using BGS' Best/1 performance calculation package.

The input to Crystal is the System Description File (SDF), which describes an application in terms of CPU usage and I/O operations and specifies subsystem parameters, hardware configuration and work-load volume projections, according to the vendor.

To aid in the building of the SDF and in characterizing application work loads, BGS has developed Modeling Description Forms that identify key application parameters and provide default values."

Once the SDF is built, the capacity planner reportedly can use Crystal to perform sensitivity analyses to identify potential performance problems. Results can be produced in tabular or graphics form to indicate service-level constraints and profile module and file utilizations.

The Crystal/IMS and Crystal/CICS Modeling Support Libraries are priced at $2,500 each for a single-site annual license for the first year.

The price includes the Modeling Description Forms, which are available for both libraries. Current Crystal users and those who purchase this package before Oct. 1 (available for $17,600 for an annual license) will receive a one-year, single-site license for both the Modeling Support Libraries free of charge.

BGS Systems is located at 1 University Office Park, Waltham, Mass. 02254.

'$Name' Adds CICS Support

DUXBURY, Mass. — Global Software, Inc. has announced support for IBM's CICS in Release 4.0 of its $Name product.

$Name reportedly provides an interactive means of maintaining and enforcing data dictionary standards when used in conjunction with MSP, Inc.'s Datamanager data dictionary product.

The release makes the software available to CICS users in OS/VS, DOS/VSE and DOS/VS environments. Also provided in the release is an enhanced autosearch capability for preexisting objects.

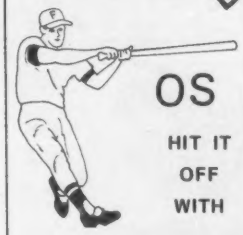
A single-site license for $Name costs $4,500 with monthly rental terms available. Global Software can be reached at P.O. Box 2087, Duxbury, Mass. 02332.

'Shipper' Bows For System/34

MIAMI — Syscom, Inc. is offering software for the shipping industry that operates on the IBM System/34.

The Shipper handles entry, matching, tariff, forms and reports functions. It costs $15,000.

Syscom is located at Suite 250, 10300 Sunset Drive, Miami, Fla. 33173.


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Utility Trio Out for VAX-11 Superminis

ENGLEWOOD, Colo. — Interactive Software Systems, Inc. (ISS) has announced three development tools for Digital Equipment Corp. VAX-11 superminis. The utilities can help programming staffs which are either developing new applications or debugging and enhancing existing systems, according to ISS.

Scan reportedly allows programmers to analyze program source code for character-string combinations. VMS-supported wild cards can be used to identify programs to be scanned.

Dump, a file dump utility, displays a formatted dump of data records from DEC Record Management Services (RMS) indexed or sequential files. In addition, it allows update and deletion of individual RMS records, the vendor said.

Compare is said to provide a function to the system tester that can be used to compare two RMS indexed files of similar record length.

The utilities are priced at $800 each, but can be purchased through an introductory offer of $900 for any two or all three for $1,000. ISS is at P.O. Box 3314, Englewood, Colo. 80155.

'Viewcomp' Versions Out for Unix Systems

NEW YORK — Unisoft, Inc. has announced four new versions of Viewcomp, its electronic spreadsheet for systems running under Bell Laboratories' Unix operating system.

Joining the existing Digital Equipment Corp. PDP-11/70 version are versions for the DEC VAX-11 series, the Onyx Systems, Inc. 8002, the Dual System 83 and the Zilog, Inc. System 8000.

The electronic spreadsheet features plain-text data bases compatible with standard Unix utilities, a definition capability that reportedly allows named columns, rows and formulas, a library facility to develop and maintain families of work sheets and a simplified method for accessing information already in the work sheet, the vendor said.

The various versions are priced at $500 for PDPs, $800 for VAXs, $425 for the Onyx and Zilog systems and $400 for the Dual system. Unisoft is located at 303 W. 42nd St., New York, N.Y. 10036.

'TEC Software' Introduced For VAX-11

NEWTON, Mass. — The EDP Corp. (TEC) has introduced its manufacturing package for the Digital Equipment Corp. VAX-11 family of superminis.

TEC software is said to be on-line and interactive, providing the necessary services for the complete automation of inventory control, bill of materials, production control and financial control. The system is said to be modular and integrated, using the VAX virtual memory operating environment.

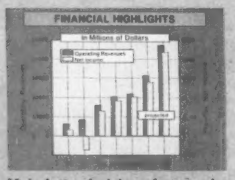
The software package is available unbundled for $60,000 or bundled from $75,000 to $150,000. More information can be obtained from The EDP Corp., 30 Tower Road, Newton, Mass. 02164.

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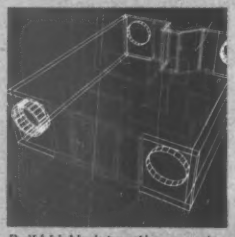
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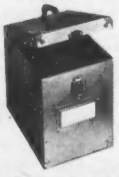
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Dictionary Loader Option Added to Cullinane's IDD

WESTWOOD, Mass. — Cullinane Database Systems, Inc. has added a Dictionary Loader Option to its Integrated Data Dictionary (IDD) for users of IBM and plug-compatible systems.

This option was designed to analyze existing Cobol source programs and automatically update the IDD.

Using the dictionary loader, Cullinane users can automatically extract information from existing systems and store it in the IDD, the vendor explained. Once information is resident within the IDD, it reportedly becomes available via Online IDD, the data dictionary reporter and Online Query.

The Dictionary Loader Option was designed to enable users to automate the dictionary analysis and loading process and then use the IDD to evaluate, maintain and upgrade the existing systems.

The software package is available with IDMS-1982 for $10,000, the vendor said from 400 Blue Hill Drive, Westwood, Mass. 02090.

Nonstop II Users Get EFT Package

OMAHA, Neb. — Applied Communications, Inc. has announced an electronic funds transfer (EFT) package for users of Tandem Corp. Nonstop II minicomputers.

Called Base24, the on-line package will interface with most brands of automatic teller machines, point-of-sale terminals and host configurations, the vendor said.

The package manages both retail and administrative transactions. The package also performs switching functions in either proprietary or shared networks, the vendor said.

The Base24 package costs about $300,000, the vendor said from 206 S. 108th Ave., Omaha, Neb. 68154.

'Base-Builder' Out for HP 3000

BUFFALO, N.Y. — Bradmark Computer Systems, Inc. has introduced a data base utility for users of the Hewlett-Packard Co. 3000.

Base-Builder is a data base copy utility intended to help the user assemble a sample or test data base from a large production data base using selection criteria.

Through the identification key data set within the data base, as entries are copied from the data set, all supporting related entries are created throughout the remainder of the data base, the vendor said. The product operates on the pyramiding principle, using key data sets and schema relationships as the building blocks to develop a sample data base. The one-time license fee for Base-Builder is $750.

Bradmark also announced a price increase on another of its data base utilities for the HP 3000, the DBCopy II. Its price has been raised to $2,500, the company said from 4446 Main St., Buffalo, N.Y. 14226.

System/23 Datamaster Gains Collection Tool

NORTON, Ohio — Lynn Data Systems has introduced a Collections System program for the IBM System/23 Datamaster.

The system is said to permit the entry and editing of Client and Debtor master files and to produce a number of reports reflecting debtor status and payment activity throughout the month, according to a spokesman for the vendor.

The software costs $4,500 from the vendor at 3262 Wadsworth Road, Norton, Ohio 44203.

DBMS Runs Under VM/CMS, Aids Scientific Applications

SANTA ANA, Calif. — A data base management system (DBMS) designed for engineering and scientific applications on IBM and plug-compatible processors operating under VM/CMS has been introduced here by California Software Products, Inc.

Maxximum DBMS includes an interactive host language and high-level user interfaces, according to the vendor. It also has a restructuring utility that enables the user to modify the structure and format of an existing data base, the vendor said.

The product is available in two configurations in the VM/CMS environment. The first reportedly allows the user to operate in a single-user mode much like a personal computer environment and is recommended for situations where a limited number of Maxximum users are operating within the confines of a general-use DP system. The user resides as a guest within the system without affecting the non-Maxximum users.

The second configuration is said to provide for a larger number of concurrent users with shared data bases and facilities.

Depending upon configuration, Maxximum is available for VM/CMS systems at prices ranging from $55,000 to $97,000; quantity discounts are also available. California Software Products is based at 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.

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Micro Notes

Business Computer Systems, Inc. has announced the availability of its **Flexware** application software development system. It was designed for users of microprocessor-based and larger systems running under Softech Microsystems, Inc.'s University of California at San Diego (UCSD) P-System operating environment with UCSD Pascal.

Flexware reportedly is built around a data dictionary and can be used to develop application packages and do custom programming. It is said to support multiple users in both a central processor and microprocessor network. The Flexware system is parameter driven and was designed to automatically generate end-user documentation of the design of menus, screens, the system design itself, required and optional user interaction and descriptive help text.

The vendor said Flexware is available for most microcomputers and minicomputers, including Apple Computer, Inc. and Digital Equipment Corp. equipment. It also is available for users of IBM 4300 systems.

Its limited-use license fee is $3,600/system for the Flexware development system. The variety of applications that are available, written in Flexware, vary in price from $500 to $1,500, depending on the packages.

Further information is available from Business Computer Systems, Suite F, 3431 Pomona Blvd., Pomona, Calif. 91768.

Computing!, a California company, has introduced its menu-driven software package called **Power** for microcomputers using the Digital Research, Inc. operating system, CP/M. The program is said to allow the user to copy, type, erase and rename files and reclaim erased files; test disks; fix bad disks; and move, display or change memory or actual information on the disk, a spokesman said. It is available for $149 from the vendor at 2519 Greenwich, San Francisco, Calif. 94123.

Micro/Terminal is a communications software package introduced by Microcom for the Apple Computer, Inc. Apple II, Apple III and IBM Personal Computer. It is said to exchange information interactively with other microcomputers, minicomputers and mainframe computers, information services, time-sharing services and bulletin board systems. The package ranges in price from $84.95 to $99.95 from the vendor at 1400A Providence Highway, Norwood, Mass. 02062.

Real Decisions Corp. has introduced its **Datamover** software package for the IBM Personal Computer. It is said to communicate with 40 time-sharing systems utilizing nine different types of hardware and many different operating systems. It allows interactive access to any timesharing system to accomplish simple terminal activities as well as more sophisticated manipulation of local and remote files on a time-sharing service or in-house installation. It is available for between $100 and $400 from the vendor at 123 High Ridge Road, Stamford, Conn. 06905.

Lifeboat Associates has introduced a multiuser operating system for distributed data processing with any Zilog, Inc. Z80-based microcomputer. **Bridos** is said to allow 16 users to share data files and permit each user to protect files against entry or inspection by other users. It is available for between $385 and $635 from the vendor at 1651 Third Ave., New York, N.Y. 10028.

North Star Computers, Inc. has introduced an enhanced version of its data base package for its Advantage and Horizon microcomputers. **dBase II's** modifications include greater system security, expanded cursor functions for screen format control and the tailoring of the full-screen mode to use the vendor's graphics display, a spokesman said. The package is available in the fall for $700 from the vendor at 14440 Catalina St., San Leandro, Calif. 94577.

Apple Computer, Inc. has announced that application programs running on Digital Research, Inc.'s CP/M operating sytem will run on the Apple III with the use of the **Apple Softcard III System** from Microsoft Corp. No software or hardware modifications are required to install the system circuit board, which plugs into any of the Apple III's peripheral card slots, according to the vendor. The system is available for $450. More information is available from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

Eagle Enterprises has announced a **Professional Citation System** for Zilog, Inc. Z-80- and Intel Corp. 8080-based microcomputers. The package reportedly provides integrated screen handling, on-screen editing capabilities and a file structure similar to IBM's Indexed Sequential Access Method. It requires 48K bytes of random-access memory, an 80-col printer and can be installed from a simple menu program for most addressable cursor CRT terminals, the vendor said. The package costs $250, the vendor said from 2375 Bush St., San Francisco, Calif. 94115.

A disk file librarian for the Digital Research, Inc. CP/M and MP/M operating systems is available from Advanced Micro Techniques. Called **Microlib**, the package is said to reduce the amount of space required to hold disk resident files. The package provides users with two levels of security and maintains a 50-char. description with each file saved in the library, the vendor said. It costs $295, the vendor said from Suite 209, 1291 Hillsdale Blvd., Foster City, Calif. 94404.



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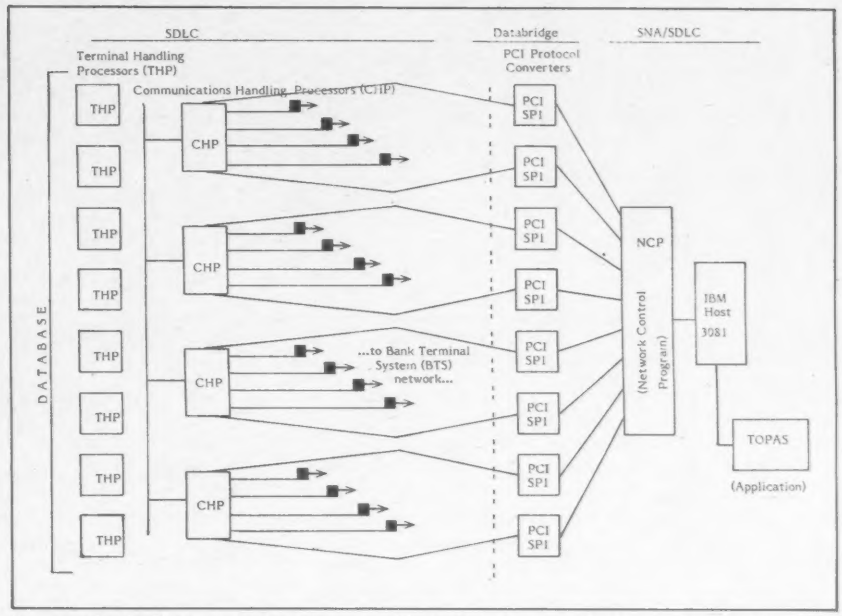
Bank Goes Protocol Conversion Route

WOODLAND HILLS, Calif. — When Security Pacific National Bank wanted to coordinate all the on-line application program development for its 600 California branches within the framework of IBM's Information Management System (IMS), it decided to go the protocol conversion route.

The network tying the banks together is known as the Bank Terminal System (BTS). It provides branch office personnel with on-line access to customer accounts and on-line memo posting.

Coordinating application program development was a first step in the development of a new system that will ultimately centralize all on-line activity from any Security Pacific office to a single IMS data base.

Development of this kind of system means moving from the Ascii-based (non-Systems Network Architecture (SNA)/Synchronous Data Link Control (SDLC)) minicomputer environment, which now forms the base of the BTS system, to the IBM/IMS data base concept using SNA/SDLC. The costs in making such a move can be staggering. In Security Pacific's case, making the move could mean purchase of up to 6,000 IBM-compatible terminals plus other hardware as well as the development of software to access its IBM host directly. It could also mean considerable retraining of staff as they learned to use a new system.



Security Pacific National Bank's Topas provides network communications and an on-line integrated data base system.

Security Pacific made the decision to find a way to make the move by devising a path for migration of the data from the non-IBM minicomputer-based environment to the IBM host rather than investing heavily in new equipment. "We had to find a data bridge," said Robert Carvalho, Network Services Division vice-president at Security Pacific.

"Though the BTS system is Ascii-based, and incompatible with the IBM host, that was not the real problem," Carvalho said. The BTS system, a mini-host environment consisting of 12 General Electric Co. 440 processors, has a built-in converter from Ascii to Ebcdic. "It was the networking capability that we needed," he said.

"We began trying to find a way to bridge the gap between our minicomputers and a network environment. We tried to determine whether there was any support for non-SNA/SDLC capability within our existing system," Carvalho explained.

The first possible solution to present itself was found in the bank's intelligent transaction controllers (ITC) from Honeywell, Inc. The ITCs are 32K-byte minicomputers that support 16 terminals. Every branch has at least one and they are programmable. "First we thought we could convert them to SNA," he said, but further research showed that this method would interrupt operations for up to 18 months while a new system was in development.

While still searching for a way to build a migration path, representatives from Protocol Computers, Inc. (PCI) contacted Karl Nielson, a vice-

(Continued on Page 56)

Processor Simultaneously Supports Communications via Four Protocols

FORT LAUDERDALE, Fla. — Harris Corp. has unveiled a high-speed, multiuse communications network processor that it said simultaneously supports communications via asynchronous, synchronous, isosynchronous and X.25 protocols in a variety of devices.

The microprocessor-based front end's capability of mixing various communications modes on the same controller is said to provide efficient utilization of chassis space and be economical because the user needs to purchase only one board for multiple functions. The CNP was designed for transmission speeds from 110 char./sec for low-speed devices to 1.544M bit/sec for networking functions.

It was designed to allow users to interface Harris' entire line of VOS superminicomputers to a broad range of communications protocols. These include binary synchronous communications (BSC) for IBM remote job entry (RJE) and host support, Sperry Univac and Control Data Corp. RJE, isosynchronous protocol to support the Tektronix, Inc. 4010 family of graphics terminals, Teletype Corp. and Beehive International, Inc. asynchronous and high-level data link control (HDLC) framing for packet-switched networks.

The CNP is a direct-access processor with 64K bytes of memory. It consists of a main processor board and a maximum of eight port boards. Fully configured, it can support up to 16 communications lines for either local or remote device connection. Each of those 16 lines can support a different protocol at different speeds concurrently.

The Model 8470 CNP costs $3,500. The RS-232C interface to X.25 communications (Model 8475-1) costs $1,200. The V.35 interface to X.25 communications (Model 8475-2) costs $1,500. Harris is located at 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Accessed by Transaction Terminals

Banking, Retail Get Telenet Service

VIENNA, Va. — GTE Telenet Communications Corp.'s Telenet public data network now supports dial-in access by transaction terminals such as the GTE Micro-Fone. The terminals are used by the retail and banking industry for credit verification, check guarantee and electronic funds transfer.

Called Transaction Processing Network Service, the service permits users equipped with the terminals to dial a local Telenet network access number rather than call long distance to gain access to the credit issuer's host computer system.

Users' host systems are connected to the Telenet network by means of a dedicated access facility (leased line) and a hardware or software X.25 interface at normal tariff rates. Dial-in calls to these hosts are charged based on usage; charges can also vary with monthly volume and time of day.

Usage is measured in transaction processing units (TPU). A TPU is defined as a connection with a duration of less than 30 sec and a data content of less than 20 packets, each of which may contain up to 128 char.

Charges for daytime usage (8 a.m. to 6 p.m.) are 16 cent/TPU. For evening and weekend usage, which are peak business hours for many retailers, charges begin at 10½ cent/TPU and decline with increasing monthly volume to 9 cent/TPU.

GTE Telenet is based at 8229 Boone Blvd., Vienna, Va. 22180.

Bank Cashes In by Taking Protocol Conversion Route

(Continued from Page 55)

president in the Telecommunications and Information Services Department. A few meetings later, both Nielson and Carvalho were convinced that PCI could provide the solution they needed. PCI develops and manufactures a line of protocol converters, which covers Ascii to SNA/SDLC, Ascii to binary synchronous communications (BSC) and BSC to SNA/SDLC conversions to a wide variety of IBM host environments.

Guidelines Imposed

Once it was agreed that PCI's units would be used, Security Pacific imposed some guidelines. Since the BTS system could communicate with its intelligent ITCs and since the PCI protocol converter was a programmable device, they suggested to PCI that its software be redesigned to interface with the existing BTS system.

PCI came back within weeks with a fully developed protocol converter to Security Pacific's specifications. Because the unit had been customized, it was called the PCI-SPI.

Ten units were purchased and installed in January 1982, eight to be in active duty and two to provide room for expansion. The first application to use them as a data bridge will go into effect in August 1982. This application, called Topas, is only the first of several to bring network communications and an on-line integrated data base system to Security Pacific.

Topas will provide on-line access of customer accounts from an IBM/IMS data base. When this system goes into effect, current customer statement information will no longer be the responsibility of the branches. A second application, Commercial Deposit System, will be on-line by early 1983. Others will soon follow, Carvalho said.

"The PCI units give us the capability to utilize our in-place network to route transactions from the branches to our IMS environment in the IBM host. It also allows us to migrate all of our BTS applications from our minihost environment as time permits just by switching those transactions that require it," Carvalho said.

Carvalho said that it is difficult to say how costs compared between the installation and use of the SP1s and purchasing new SNA/SDLC equipment. "Costs saved in equipment purchase have been immeasurable. Compare the cost of 10 PCI boxes to the cost of 6,000 terminals," he said.

Wanted: Data Network Users

Data communications networks are becoming pervasive in day-to-day computer operations. A Sept. 27 *Computerworld* Special Report on data communications networks will address the communications explosion and how users are trying to harness it.

We want you to contribute to this Special Report. Your articles can address any of the key networking issues:

- Reliability, integrity and security — how can they be obtained and maintained?
- What's new with packet-switching networks? What are their advantages and disadvantages? Who can afford them?
- What are the long- and short-haul alternatives to the Bell system?
- How do local-area networks fit into users' needs, and when is a private branch exchange (PBX) more appropriate than a network based on coaxial cable?

We would also like to see articles on network planning and management, standards development, protocol conversion and data communications in the office.

Your stories should be between five and seven pages, double-spaced and typed.

Send them by Aug. 13 to Bruce Hoard or Jim Bartimo, *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.



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"How does Lanier connect to my IBM mainframe?"

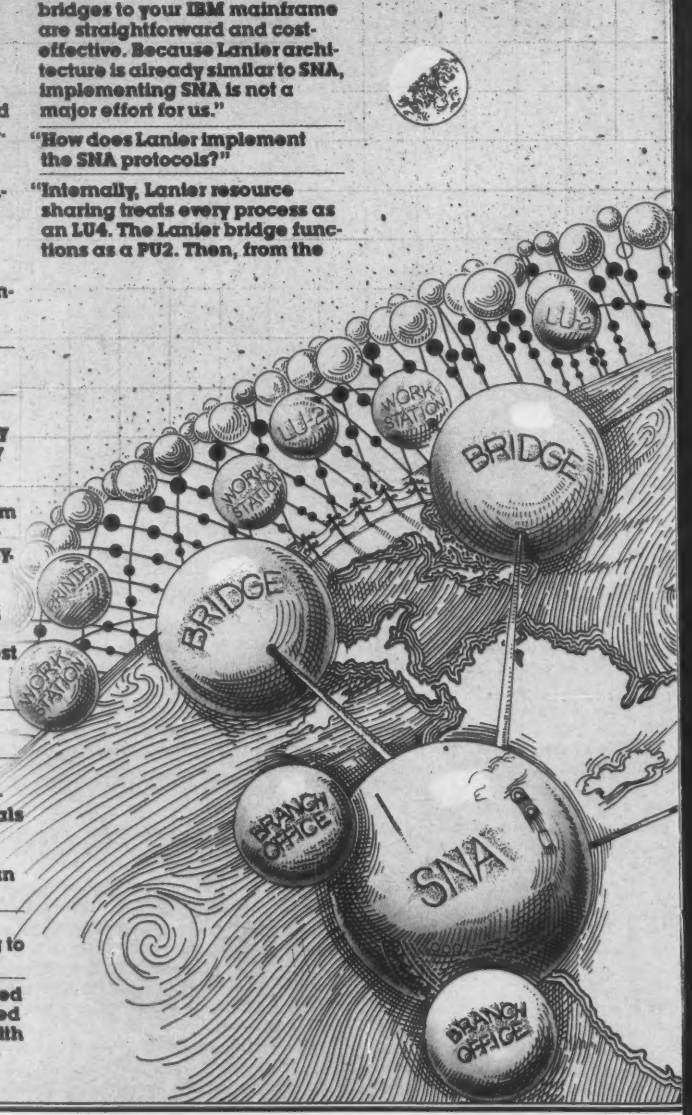
"With 'bridges.' Inexpensive interfaces connect Lanier system elements, such as terminals and printers, to each other. These interfaces lead to a 'bridge.' The Lanier bridge can talk to an SNA system."

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"How does Lanier implement the SNA protocols?"

"Internally, Lanier resource sharing treats every process as an LU4. The Lanier bridge functions as a PU2. Then, from the



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Honeywell Printers Made For Bank, Airline Systems

WALTHAM, Mass. — Honeywell, Inc. has introduced two low-cost compact receive-only dot matrix impact printers for administrative use with its banking and airline terminal systems, its clustered terminal subsystems and its VIP7800 family of transaction processing terminals.

The PRU7065 and PRU7066 printers are designed for customer installation and immediate use. They print 132 char./line at 100 char./sec. on paper up to 15 in. wide and also use bidirectional logic-seeking printing for maximum throughput.

They use 9 by 7 dot resolution and use the 96-char. Ascii set. The printers feature descenders, underlining, double-width characters and uppercase/lowercase printing.

The PRU7065 printer is compatible with the company's Series 1500 family of airline terminals, the Series 7000 family of banking terminals and the VTS7710 small- and large-cluster CRT terminal subsystems and SPD 20 terminal processing units.

The PRU7066 accepts general DP output via a buffered printer adaptor supporting both asynchronous VIP7801/7802 and synchronous VIP7804/7805 single-station keyboard CRT terminals.

Each printer has a purchase price of $1,495, available from Honeywell, 200 Smith St., Waltham, Mass. 02154.

M/A-COM Cuts Modem Prices

GERMANTOWN, Md. — The Datacom Products Division of M/A-COM DCC, Inc. has announced a price reduction for its 9,600- and 4,800 bit/sec integral modems.

The price of the 9,600 bit/sec four-channel integral modem has been reduced by 23% and now costs $2,700.

The 4,800 bit/sec four-channel integral modem has been reduced by 17% and is now priced at $1,850.

More information on the modems is available from M/A-COM DCC's Datacom Products Division, 11717 Exploration Lane, Germantown, Md. 20767.

Two Vendors Combine Units To Send Data

SANTA CLARA, Calif. — Ven-Tel, Inc. and Racon, Inc. are offering a combination of the Ven-Tel Model SLD-3 synchronous line drive and the Racon I Microwave Communication System, which reportedly transfers synchronous data at 19.2K bit/sec.

The configuration is said to provide an economical, versatile solution to difficult and expensive application problems. For instance, a mile of trenching and line placement can cost as much as $15,000 and require 60 to 90 days installation, the two vendors claimed.

By contrast, the combined configuration the two are offering can be installed over a variety of natural barriers and obstructions in a single day for less than $10,000, a spokesman said. The configuration can also be removed and reinstalled as the user's needs change.

The SLD-3s cost $450 each and two are required. The Racon I is $7,500.

More information is available from Ven-Tel at 2342 Walsh Ave., Santa Clara, Calif. 95051 or Racon at 12628 Interurban Ave. S., Seattle, Wash. 98168.

Protocol Converter Ties IBM, CP/M

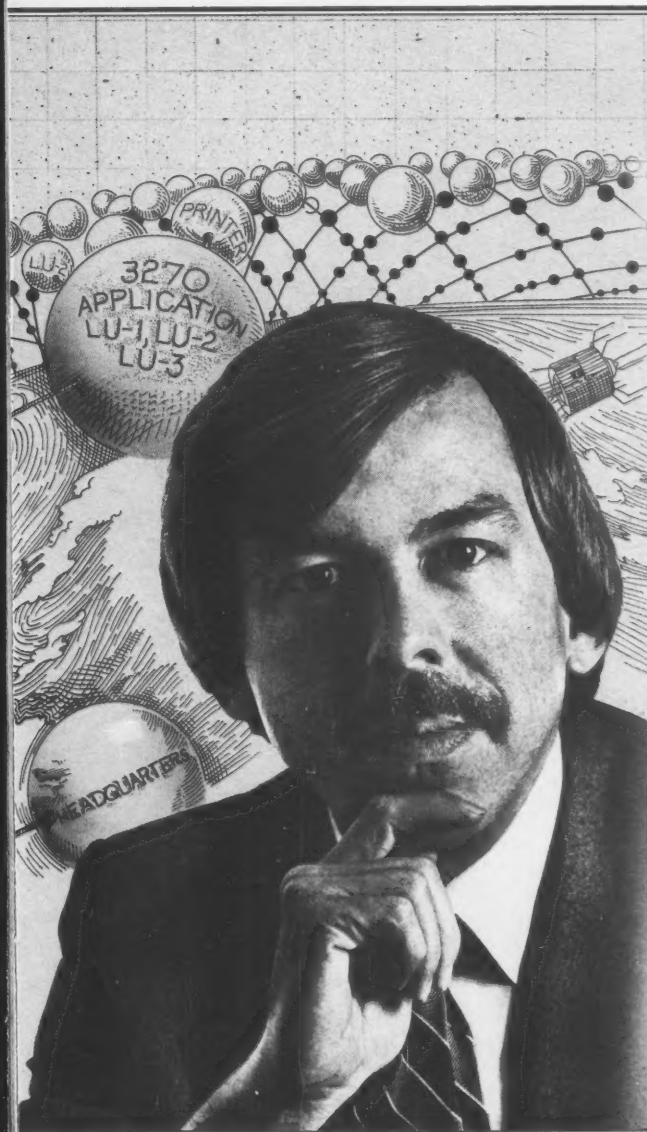
FEASTERVILLE, Pa. — Alphamatrix Inc. has introduced a protocol converter for attachment to a microcomputer using the Digital Research, Inc. operating system CP/M. It is said to enable direct access to IBM and other large host data communications systems by allowing the CP/M device to operate as if it were one of the host's own remote devices.

The C-BAX unit is a modem-size, self-contained external converter that attaches to the CP/M computer's serial I/O port, the vendor reported.

The standard converter costs $1,900 and is available from Alphamatrix Inc., 1021 Millcreek Drive, Feasterville, Pa. 19047.

"As compatible as equivalent IBM systems."

Marvin Gaines, Director, Data Communications, Electronic Office Systems Division



host computer's point of view, your Lanier terminals are LU2s and the printers are LU1s or LU3s."

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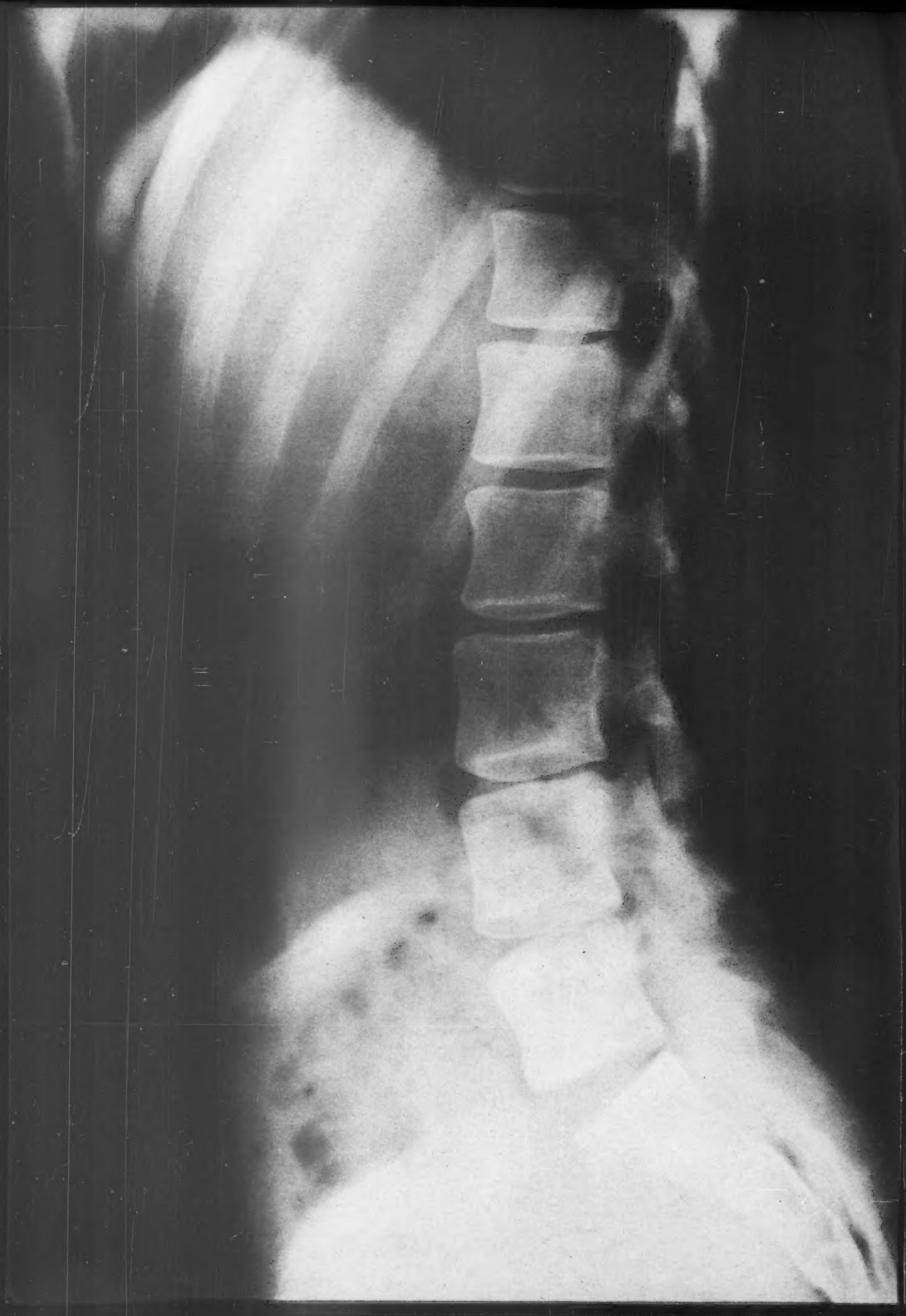
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Users Bear the Burden

DP Maintenance: A Costly, Complex Job

By Tim Scannell
CW Staff

Computer maintenance was a relatively simple job in 1956, when a handful of engineers would be assigned to a single computer site to ensure that a single computer system was kept up and running.

Today, however, things have become a great deal more complex. Engineers are no longer confined to single sites, but are responsible for a number of computers that might be stand-alone systems or a part of a large distributed processing network.

Along with these responsibilities, the cost of retaining these engineers and repairing highly complex computer equipment has escalated to the point where equipment maintenance sometimes amounts to double the computer's actual cost.

Service contracts that once equaled 25% to 30% of a computer system's total cost now account for nearly half of that machine's total. And in a few years, fully two-thirds of a computer's life-cycle cost might be taken up by maintenance and repair, according to statistics compiled by International Data Corp. (IDC).

User Bears the Burden

Not surprisingly, it is the user who must bear the burden of these rising maintenance fees.

Users basically have two choices that might help soften the blow of maintenance costs. They can either select their vendors more carefully, giving more attention to the reliability and performance of the computer system down the road or they can opt for alternative maintenance tactics that could, in the long run, cost less than having an engineer drop into their site to fix the computer every time the machine makes an awkward bump in the night.

The most popular service strategy today is board swapping, or removing an ailing part from a user's computer and immediately replacing it with a working piece. This strategy is popular for a number of reasons:

- Most companies are so firmly plugged into their computer systems that even the slightest downtime can cost thousands of dollars in lost processing time and delays. Therefore, the machines have to be up and running as soon as possible.
- Today's entry-level field engineers are not as skilled as their counterparts were six or eight years ago. The reason for this is the continuing need for engineers, which produces a lot of trainees, and the fact that in years past the military draft gave a lot of budding engineers free and qualified training in computer repair. Unfortunately, technical schools and two-year colleges cannot churn out the numbers of engineers that a mandatory draft system could.

The major drawback of board swapping is that it is expensive. The total cost of sending out an engineer to replace a bad board, including diagnosing the failure, replacing the board, retesting the system and sending the board back to be repaired costs about $500, IDC said in a just released report on maintenance technology trends. Adding to the financial misery is the fact that from 30% to 50% of the boards sent back for repair actually prove to be good after proper testing.

In the past few years, both users and ven-

(Continued on Page 62)

Users Turning to Depot Repair Centers

Depot repair centers are proving the most popular and fastest growing method with which vendors are dealing with users' maintenance problems. Some vendors have set up these service centers next door to manufacturing facilities while others scatter them throughout the U.S. and even to international sites.

Users surveyed by International Data Corp. (IDC) of Framingham, Mass., for a recently released report on maintenance and system trends cited a number of reasons for turning to depot repair centers when a system problem occurs:

- Repair centers offer specialized equipment and highly trained people who are usually dedicated to a specific function of the computer system and can therefore more quickly pinpoint a problem.
- Depot centers are more accessible to the users.
- Use of regional service centers cuts down on the amount of travel an engineer must make to repair a computer or to make service call that may turn out to be unnecessary.
- The depot centers are slowly becoming more accessible to the customers themselves, much like some telephone companies that offer "carry-in" service for their customers.
- Vendors are rapidly increasing the number of service depots across the country. For example, Xerox Corp. plans to expand its number from 19 to 80 by the end of this year, IDC said.

Security System Stops CPU Access From Remote Units

PHILADELPHIA — A security system said to prevent unauthorized access to host computers from remote dial-up terminals is available from Exide Electronics, Inc.

The microprocessor-based Data Access Security System uses a complex algorithm to achieve security and consists of self-contained units that connect to the terminal and host computer through an RS-232C interface, according to a vendor spokesman.

No software modification is required in the host computer and existing passwords and IDs are not affected, according to a company spokesman. Prices range from $295- to $495/device, depending on quantities ordered.

Exide's Data Security Systems Division is located at 2 Penn Center Plaza, Philadelphia, Pa. 19102.

For IBM, CDC, Univac Hosts

KMW Unveils Vector Processor

WEST AUSTIN, Texas — KMW Systems Corp. has announced the VP30, a vector processor designed to accept random vectors, symbols and other graphics information from a host mainframe.

The processor can reportedly be used with large mainframes manufactured by IBM, Control Data Corp. and Sperry Univac. The standard unit features switch-selectable support for various electrostatic plotters and a vector storage capacity of 1 million vectors. In addition, the unit is capable of overlaying data to create composite plots. Other features include an erase mode, variable-area pattern fills, programmable grid lines and trace sequential data input capabilities, the vendor said.

The unit costs between $19,500 and $43,200, the vendor said from 8307 Highway 71, West Austin, Texas 78735.

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Apache Offers Color Graphics

OAK BROOK, Ill. — A stand-alone color business graphics system has been announced by Apache Electronic Systems, Inc.

The AX system is said to feature software that can be tailored to the level of detail and control required by the user — from a menu of basic commands for executive use to extensive manipulation for business analysis or graphics departments.

A basic single-user system including software, a 512 by 512 line color terminal, a monochrome terminal, a graphics editing tablet and a microprocessor with a 21M-byte hard disk costs under $40,000, the vendor said from Suite 124, 900 Jorie Blvd., Oak Brook, Ill. 60521.

Spur Users Get Trade-Up Plan

LOS ANGELES — Spur Products Corp. has announced a trade-up plan for users of dual Spur 1403 printer controllers.

Under the trade-up arrangement, users can purchase a dual controller for $5,500 if they trade in a similar single controller. The dual controller costs $22,500 without a trade-in, the vendor said.

The controllers allow users of non-IBM processors to use IBM 1403-series printers. Dual controllers allow a single printer to be driven alternately by two processors of the same or different make.

The vendor is located at 1904 Centinela Ave., Los Angeles, Calif. 90025.

Upkeep Costs Seen Rising

(Continued from Page 61)

dors have come up with a number of angles that not only decrease the maintenance cost, but bring the whole chore closer to home.

Many large firms purchase portable board testers to do their own periodic system checks and minor maintenance. The testers are usually programmable, intelligent and easy to operate. Using these devices, a firm can isolate bad boards and plug in spares that are on hand. The bad board can then be sent back to the manufacturer for repairs.

Board vendors are aiding this self-help program by "socketing" the parts — such as the actual chips — on a board. By socketing specific board parts, the whole device does not need to be replaced or tied up in a repair shop. Vendors are also providing more built-in maintenance and diagnostic lines on boards to facilitate the use of portable testers.

Depot Repair Centers

Taking advantage of depot repair centers is another way users are cutting down on the maintenance costs. Nearly every equipment manufacturer has a remote center located offsite from the main manufacturing facility. These centers, which are primarily used locally by the vendor's engineers, are usually fully stocked with testing equipment and repair parts, much like the service departments of new and used car dealerships. Defective computer parts can be brought into a service depot for repairs and a new one picked up as a substitute.

Finally, another method of keeping a lid on maintenance costs is buying a computer that offers self-test and diagnostics capabilities. Machines with these features automatically run a battery of tests when the system is switched on, or at the user's discretion. Some computers can even communicate with a remote diagnostics computer located at the vendor's site that can put the user's system through an extensive systems check. When a fault is located, engineers are automatically dispatched and replacement shipped — sometimes before the user even knows that an error has occurred.

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Price Cut On HP 250/20

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a price reduction on its HP 250/20 small business processor. With 256K bytes of main memory, the system now costs $15,250, a reduction of about 20%.

HP also cut the price of its 64K-byte semiconductor memory. Add-on memory was cut by 37½% and a 256K-byte memory enhancement now costs $2,500.

HP also announced that the HP 250 is now available with three instead of two I/O connectors. More information is available from the Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Disk System Fits HP CPUs

SAN JOSE, Calif. — Bering Industries, Inc. has announced a disk subsystem for Hewlett-Packard Co. processors.

The Bering 4895 reportedly consists of a 5¼-in. Winchester disk drive with 4.7M bytes of storage and an 8-in., 1.2M-byte floppy disk drive.

A 9.4M-byte Winchester configuration is also available, the vendor said.

The 4.7M-byte Winchester version costs $6,700. The 9.4M-byte version costs $7,700.

Bering Industries is located at 747 E. Brokaw Road, San Jose, Calif. 95112.

One Console, One Portable

Telcon Brings Out Two Micros

FORT LAUDERDALE, Fla. — Telcon Industries, Inc. has unveiled both a console and a portable computer system, which reportedly feature a 9-in. CRT display, more than 1.2M bytes of floppy disk storage and up to 24M bytes of Winchester disk storage.

The Future Series One and the suitcase-size Series Two computers, which each weigh about 22 lb, operate under TP/M — an operating system that is said to be totally compatible with Digital Research, Inc.'s CP/M software. The computers are targeted at such devices as Osborne Computer Corp.'s Osborne 1 portable computer and Kaycomp's Kay Pro II machine.

The Telcon systems utilize a Zilog, Inc. Z80A microprocessor that operates at 4M cycles. They include two built-in, 160K-byte, 40-track floppy disk drives; or two 320K-byte, 96-track disks. They can also be fitted with a single 360K-byte floppy diskette drive and a 6M-byte Winchester drive, a spokesman said. Additional drives can be added to boost the systems' Winchester capacity up to 24M bytes. All of Telcon's disk formats are IBM-compatible, he added. And the computers are said to have the capability of emulating and reading other manufacturer's disks.

While the system is based on the firm's TP/M operating system, a plug-in board will be available in early 1983 that will allow the computer to use Bell Laboratories' Unix or the C language, the spokesman said.



Telcon Future Series Two

The systems are being targeted for the Fortune 1000 company executives or the military. For latter applications, a ruggedized version of the TP/M operating system can be purchased with either machine.

Since the system uses an operating system compatible with the industry-standard CP/M, a wide range of software packages can be used on portable units. However, in order to open a wider door, the firm has initiated plans for the Telcon Library Center (TLC) club. Under the system, club members will be able to access software programs provided by Telcon by dialing a toll-free number. For a $100 yearly charge, a member will be able to retrieve software packages for $99 or $199. The fee can be charged on the user's charge card, the Telcon spokesman said.

For an additional $25, the company will forward a copy of the program on diskette and a full operating instructions manual, he pointed out. The software will be provided by major software companies and cover areas from bookkeeping to scientific and engineering applications.

The Future Series One console terminal with 320K bytes of storage costs $2,895. The Series Two — the portable version — sells for $2,395. The 640K-byte models costs an additional $200. The Future Series One and Series Two machines with 6M bytes of Winchester storage cost $4,795 and $3,995, respectively. Deliveries of the system are scheduled to begin this fall, the spokesman noted.

Telcon is located at 1401 N.W. 69th St., Fort Lauderdale, Fla. 33309.

Control, Security and Audit of Minis — Part 2

Control Procedures the Key to Security

By Nander Brown
Special to CW‡

In this second part of a three-part series on the control, security and audit of minicomputers, the author details the minimum controls and responsibilities necessary to every minicomputer system. He also discusses the security drawbacks of centralized data bases and the cost of implementation.

Next week, Brown delves into the auditability of a user's system, the types of fraud that can occur and risk analysis.

A well-managed data processing operation depends on established control procedures. For example, physically separating the computer area from other work areas minimizes the risk of accidental or deliberate machine tampering, data removal and reduction of operator efficiency.

While minicomputers require fewer environmental requirements than large mainframes, they should also incorporate minimum internal controls. These controls include the following:

• A clear-cut assignment of responsibility. This should top the user's list of requirements and be accomplished prior to the installation of the minicomputer. Responsibilities should cover computer programming, computer operations, data entry, computer backup and recovery and security.

• Documented procedures. Once responsibility has been been assigned for the above areas, documented procedures for each key segment must be prepared. As expected, these procedures should be periodically reviewed and modified and be easily available for employee scrutiny.

• A separation of programming and operating responsibilities. In order to keep some semblence of order and security, management should draw a distinct line separating programming and operating responsibilities. For instance, programmers should not have access to either live data files or the equipment to effect possible improper manipulation of live data files. By the same token computer operators should not be able to access source programs.

Companies that have a one-person computer department should not allow that person to develop computer programs and also operate the computer. If this can't be avoided, then a line management official should be sufficiently educated in computer fundamentals to supervise that person effectively.

• Management and users should be directly involved in the design, testing and installation of computer systems. Contrary to what consultants say, this important function should not be relegated to so-called "computer experts" because the ultimate responsibility for information requirements rests with management.

• The use of computer operation logs. A record should be kept of all work involving the computer that occurs during the day. A summary of this information becomes the machine utilization report. These logs should contain not only routine entries for production work performed, but also entries that reflect non-routine work such as production reruns, equipment downtime, program compilation and test time.

• All program changes should be authorized. This should be done in writing and verified for correctness by a supervisor. Finally, an authorization document should be filed to preserve the authorization audit trail and to provide a reference for fu-

(Continued on Page 64)

Expansions Boost Memory Of DG S/140 to 2M Bytes

WESTBORO, Mass. — Data General Corp. has announced expanded memory versions of its S/140 computer. The expansions reportedly boost the system's memory up to 2M bytes and are available both with new shipments and for existing installations.

The upgraded configurations are implemented using DG's 20M-byte bandwidth, four-way interleaved memory technology, according to a DG spokesman.

The modules are supported by the computer system's error-checking and correction feature, the spokesman added.

The expanded memory for the Eclipse S/140 is backed by a series of enhanced power options, according to the vendor.

Those options currently available for configurations larger than 1M byte are 110V, 220V and 240V, all of them rated at 60 Hz, the vendor said.

Current S/140 users will be able to expand their systems with memory and power supply upgrade kits available from the firm's worldwide field service organization, the spokesman added.

The memory expansion kits cost $3,500, the spokesman said from DG, 4400 Computer Drive, Westboro, Mass. 01580.

Control Procedures Key To Mini Security: Brown

(Continued from Page 63)

ture inquiries. Control of this function should not be vested in just one individual.

• A periodic review of all controls as well as system performance. Controls must be reviewed frequently to verify that they are being followed. This review is a supervisory function. Computer system performance should also be evaluated. One way to do this is through the compilation of reports that track computer operations. For example, if program reruns have increased over a period of several months due to machine, operator or software problems, a machine utilization report should indicate this trend, thus alerting management to the problem.

While the above requirements are necessary to enhance the security of minicomputers in general, the needs and the difficulties are significantly increased when a centralized data base enters the picture. External devices such as random-access disks, communications components and specialized software not only enhance the capability of a user's system, but boost the complexity of management control. The data in a centralized bank is no longer the property and under the control of an individual user.

When data can be accessed by several departments within a company, that data becomes an organizational asset and resource and its control becomes an organizational rather than a user responsibility. The accuracy, availability and protection of data become key management considerations. Therefore, to provide necessary control over a centralized data base, management must ensure the following control objectives:

• Assignment of responsibility for assuring accurate and consistent use of shared disks.

• Management of data as a valuable organizational resource.

• Development and enforcement of standards for the data base.

• Control of usage and access to the data base.

• Control of the dynamics of the data base contents and structure.

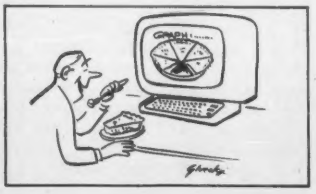
• Adequate procedures to recover the data base from errors.

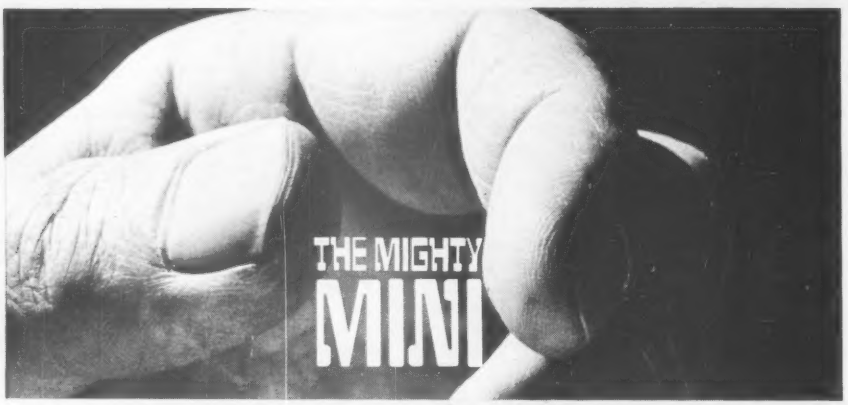
• Management of communications network components to provide integrity and security of data transmissions.

Finally, with any type of a system, the user must weigh the costs of implementing controls with the need for and benefits of those controls. Obviously, no control should cost more than the consequences of the conditions it is designed to prevent or detect. Absolute control is unattainable. The objective is to minimize, at reasonable cost, the exposure to loss that each computer system faces in its particular DP environment.

Achieving a balance between the cost of controls and the benefits is an ongoing juggling act for management. An approach to a solution is to place a reasonable value on data, information and continuity of operation. Once this is done, then a workable balance can be achieved.

Brown is assistant general auditor for the Federal Home Loan Mortgage Corp. in Washington, D.C. He previously served as regional manager for the Washington office of EDP Audit Control, Inc., where he directed the audit activities for commercial as well as governmental clients.





Cut the Purchase Decision On Minis and Small Business Systems Down to Size

According to International Data Corporation, the market for small systems has become one of the hottest areas in the computer industry today. There's a proliferation of systems to choose from. And it's getting harder to tell the difference between micros, the larger small business computers and minicomputers.

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• The legal perspective — what happens when you *do* have problems with your contract (with special attention to software).

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The Olympia Portable Computer

Olympia Unveils Portable Computer, ESW 3000 Printer

ATLANTIC CITY, N.J. — Olympia USA, Inc. has unveiled a portable computer and a letter-quality printer.

The Olympia Portable Computer (OPC) is based on a Motorola, Inc. 6502 microprocessor and features a 65-char. keyboard, liquid-crystal display and an internal battery pack. It weighs 21 ounces and reportedly supports 52K bytes of random-access memory, plus 64K bytes of read-only memory.

The computer and all optional peripherals can be carried in an attache case.

By using the optional acoustic modem or RS-232C interface, the OPC can be connected to large mainframe computers, minicomputers or other portable computers, Olympia said. Its output reportedly can be directed to a standard TV or CRT monitor, any of Olympia's letter-quality printers or a four-color printer/plotter capable of producing color pie charts, bar graphs and a variety of other displays.

The 4K-byte primary unit model costs $380; an 8K-byte model costs $480. The ac adapter comes in two versions costing $20 and $40, respectively.

The Model ESW 3000 letter-quality printer was designed for use with keyboard-oriented displays and incorporates an Olympia print wheel with 100 characters. Features include standard lettering in several type styles, proportional spacing, four pitches, bidirectional printing and print wheel cassette insertion for operator convenience.

The print speed of the ESW 3000 is 35 char./sec. Tractor- and sheet-feed options are available.

The printer costs $2,000, according to Olympia, which can be reached at P.O. Box 22, Somerville, N.J. 08876.

Compal's Electronic Office Features Three Groupings

WOODLAND HILLS, Calif. — Compal, Inc. has unveiled its Electric Office line of computer and word processing products. It consists of three product groups: a portable computer grouping called the Electric Briefcase, a desktop stand-alone computer group called the Electric Desk and a multiterminal, time-sharing and networking group called the Electric Office.

All of the products reportedly will be able to communicate with each other through the vendor's Electric Network, Electric Phone (modem/phone combination) and/or the Electric Terminal, directly connected to a time-shared Electric Office system.

The Electric Desk group includes a Compal Eztype stand-alone processor, 8200 computer/word processing system and 8200-Plus hard disk system with up to four shared terminals. The systems are priced between $4,695 and $26,000 depending on configuration.

The Electric Briefcase has two primary models: a hand-held computer for remote entry of sales, inventory and billing data; and a larger portable computer for remote data entry, simple word processing, spreadsheet analysis, local accounting and other low-volume applications.

The systems will be available this fall and cost between $1,000 and $5,000.

The Electric Office will have a central expandable computer that has both networking and time-sharing capabilities, the vendor said. Available in the fall, the systems will range in price between $11,000 and $35,000 depending on the disks and peripherals selected.

The idea behind the Electric Office is to give first-time computer users a line of products that are plug-compatible, upgradeable and complementary, Compal said. If a prospective buyer cannot afford an Electric Desk, he can start with an Electric Briefcase, the vendor noted.

When his needs expand, he can purchase the Electric Desk for his office and take the Electric Briefcase home or to the client's office. When the need arises, he can enter and store information into the Electric Briefcase and transfer it to the Electric Desk or the Electric Office systems for final processing, the vendor said.

Compal is located at 6300 Variel Ave., Woodland Hills, Calif. 91604.

Unimail Service Handles Interdepartmental Messages

KANSAS CITY, Mo. — United Information Services, Inc. has unveiled an electronic message system designed to cut costs and the time associated with the transfer and control of information through a company's different departments and functions.

Unimail Service reportedly requires no special hardware. Users type information that is stored and delivered as directed on existing terminals that are linked to a central computer located in one of the vendor's main technical centers.

In a typical situation, a user dials up the central facility, composes a message and addresses it to one or more subscribers on the system, the vendor said. The central computer then deposits the message in the mailbox of the addressee. Mail is picked up when the addressee dials up the system and checks for messages.

The user is able to access incoming mail at his convenience. He can dispose of, pass on or file information. Storage and retrieval features are the base of the package's electronic folder concept. Users can create any number of folders for quick, logical access to memos, marketing data, bid proposals or any information produced and filed manually.

Customers are billed on how much they use the system. There is also a monthly mailbox maintenance charge. In addition, users are billed for the number of 10-line message units composed, sent and read. Filing charges are incurred when messages are retained, the vendor said.

United Information Services, Inc. is a division of United Telecom Computer Group. It can be reached through P.O. Box 8551, Kansas City, Mo. 64114.

PDP-11 Users Get Word-11 Price Cuts

PLACENTIA, Calif. — Data Processing Design, Inc. has reduced to $4,500 the price of its Word-11 package designed for Digital Equipment Corp. PDP-11 processors running under RSX-11M.

Word-11 remains available for DEC's RSTS/E and VAX/VMS operating systems at $8,500 and $9,500, respectively.

Data Processing Design is located at Suite F, 181 W. Orangethorpe, Placentia, Calif. 92670.

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Britton-Lee Planning To Liquidate Insac

By Marcia Blumenthal
CW Staff

LOS GATOS, Calif. — Britton-Lee, Inc., which acquired Insac Software, Inc. from the British Technology Group last March, disclosed that Insac's board of directors have voted to liquidate the subsidiary and seek protection from creditors in federal court.

The liquidation will not have any material impact on Britton-Lee's operation, according to the firm's president, David Britton.

Recently, Altergo Software Ltd., which had licensed software to Insac, terminated all software licenses to Insac, alleging breach of contract.

No Disruptions Seen

However, the actions should not cause any disruption to users as Altergo will now maintain all contracts for software sold by Insac, Britton said.

"The Altergo cancellation came at a time when Insac and Altergo were locked in litigation in Great Britain over disputes arising from earlier licensing arrangements," Britton-Lee said.

Relations between Insac and Altergo have been stormy for some time. Insac acquired the U.S. arm of Altergo, Altergo Software, Inc., in March of 1980. However, last October the two firms called it quits, but Insac retained the rights to market Altergo's CPG and Guts products in North America [CW, Oct. 12].

Over the years Insac has obtained massive infusions of funding through the National Enterprise Board (NEB), now the British Technology Group. As one observer put it, the NEB invested about $6 million in Insac to bring it to a point where it was still unprofitable.

Although the acquisition of Insac by Britton-Lee appeared somewhat inappropriate, Britton-Lee, a developer of a back-end data base processor, received an investment from the British Technology Group as part of the terms of the acquisition. The acquistion agreement insulated Britton-Lee from any of the ramifications stemming from the litigation that was going on between Altergo and Insac.

Britton-Lee viewed the acquisition as a means of acquiring sales expertise in the IBM marketplace to spur sales of its data base processor, Britton reported. At the time of the inquisition, Insac's sales force numbered about 20. Currently, the future of those salespeople is uncertain.

The cumulative impact of Altergo's recent termination of remaining Insac licensing agreements and the ongoing British litigation has posed a severe strain on Insac's financial and managerial resources, resulting in the decision to liquidate the firm, Britton-Lee said.

Mainframe Vendors Report Lower Earnings; Burroughs an Exception

Major mainframe vendors are reporting second-quarter earnings that are generally lower than those reported in the year-ago quarter. The exception is Burroughs Corp., which posted a 15% gain in net income.

From Detroit, Burroughs reported second-quarter earnings of $36.5 million or 86 cents per share compared with 1981's second-quarter earnings of $31.3 million or 75 cents per share. Six-month earnings hit $63.5 million or $1.51 per share, up from $53.6 million or $1.29 per share for the comparable period last year.

Revenue for the latest period was $1.1 billion, up 27% from revenue of $834 million in the same quarter a year ago. Revenue for the first half climbed to just over $2 billion, up from $1.6 billion for the first half of 1981.

Burroughs Chairman and Chief Executive Officer, W. Michael Blumenthal said that the firm had strong order activity for its small business and document processing systems during the quarter. Incoming orders for the quarter exeeded $1 billion, he said.

Lower Earnings Posted

From Minneapolis, both Control Data Corp. and Honeywell, Inc. overall posted lower earning results. CDC's consolidated second-quarter earnings dropped to $34.2 million or 91 cents per share from $43.3 million or $1.14 per share in the 1981 second quarter. Revenues were just over $1 billion compared with 1981 second-quarter revenues of $996 million.

CDC's computer and information services business account-

(Continued on Page 68)

The Giants Invade Each Other's Turf

• *IBM Signs Up Mitel To Develop PBX*

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — "IBM realizes they have to get farther into the PBX [private branch exchange] business and haven't much time to do so," consultant Dixon Doll, a veteran IBM watcher, said last week. He was referring to the statement recently released by Mitel Corp., a major Canadian-based PBX manufacturer, announcing an agreement in principle to develop a "new IBM family of unique line-switching capabilities."

Doll believes that IBM went outside partly because of the growing prospect of unregulated competition from AT&T. Among the products likely to be announced shortly by the phone company is Antelope, its long-heralded ad-

(Continued on Page 71)

• *AT&T Projects 1984 For Personal Computer*

By Phil Hirsch
CW Washington Bureau

MORRIS PLAINS, N.J. — AT&T will be marketing an on-line personal computer "as early as 1984," says its Eastern Management Group (EMG), headquartered here, in a recent report. At least six other private branch exchange (PBX) manufacturers will be doing likewise by 1987, the consulting firm added. It also predicted that beginning in 1987, 5% of the terminals attached to large PBXs will consist of personal computers integrated with telephone handsets, keyboards and 12-in. display screens. These "intelligent telephones," EMG said, will account for 10% of all new PBX instrument sales by 1992.

"Six years ago, no one even thought of a desktop computer for office workers," according to

(Continued on Page 70)

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Earnings Drop for Mainframers

(Continued from Page 67)

ed for $798 million of the total quarterly revenues and $33.7 million of the earnings.

However, CDC attributed part of its weak financial performance to a decline in orders for peripheral equipment from other manufacturers.

For the first six months, CDC's earnings were $72.5 million or $1.92 per share, compared with earnings of $83.6 million or $2.20 per share for the same quarter a year ago. Revenues for the first half totaled $2.1 billion, up from $2 billion a year ago.

CDC confirmed that it was closing its 15-year-old computer parts plant in Seoul, South Korea because of labor problems and because technology advances reduced the need for the plant's labor-intensive products.

While Honeywell, Inc.'s second-quarter earnings of $85.6 million or $3.83 per share were higher than last year's earnings of $74 million or $3.15 per share, some $39 million was attributed to the sale of 27.1% of the firm's interest in CII-Honeywell Bull and other deferred income from that sale.

Revenues from the latest period of about $1.3 billion were approximately even with last year's second-quarter revenues.

Second-Quarter Orders Up

The firm said that while its second-quarter U.S. orders were lower than last year's orders for the same quarter, those orders were up substantially from the first quarter of this year.

For the first half of the year, Honeywell's revenues were $2.5 billion — about level with last year's first half.

Earnings for the first half, including capital gains of $66 million and extraordinary items, totaled $141 million or $6.31 per share compared with earnings of $124 million or $5.46 per share for the first half of 1981.

Meanwhile NCR Corp. posted a 3% quarterly decline in earnings. Earnings for the second quarter were $50.6 million or $1.90 per share compared with last year's second-quarter results of $52.3 million or $1.94 per share.

However for the first half, NCR's earnings rose 2%, reaching $81.2 million or $3.04 per share, compared with 1981's first half earnings of $79.8 million or $2.96 per share.

Revenues Up in '82

Revenues for its second quarter were $872 million, up from $854 million in the same quarter a year ago. For the first half, revenues advanced 2% to $1.6 billion from $1.58 billion last year.

Amdahl Corp. posted a decline in both revenues and earnings for the period. Second-quarter revenues were $106.8 million compared with $107.9 million in the like quarter a year ago. For the first six months the firm's revenues advanced to $216.6 million from $203.4 million.

Earnings for the second period declined substantially to $1 million or five cents per share from $7.3 million or 35 cents per share a year ago. For the first half the firm's earnings dropped to $3.5 million or 17 cents per share, down from $20.5 million or 63 cents per share a year ago.

Amdahl President Jack Lewis attributed the poor earnings showing to unfavorable foreign currency exchange rates, price pressure and start-up expenses for its new products.

Wang Revenues Hit $1.2 Billion

LOWELL, Mass. — Revenues at Wang Laboratories, Inc. hit the billion-dollar mark during fiscal 1982.

For the fiscal year ended June 30, Wang reported revenues of $1.2 billion, up 35% from the $856 million in revenues reported last year.

Earnings totaled $107 million or $1.76 per share, up 37% from the $78 million or 36 cents per share reported in fiscal 1981.

During the year, new orders for the firm's products topped $1.3 billion, a 32% increase from the orders received in 1981, according to the company.

MAI's Sorbus Opens Three Service Centers

FRAZER, Pa. — The Sorbus Service Division of Management Assistance, Inc. has opened its first three carry-in service centers for small business systems and terminals.

The firm has opened its Sorbus Stations in Philadelphia, Chicago and Santa Ana, Calif.

The centers will provide repair services and offer a line of supplies for most makes and models of small computers, printers and CRT units.

Turnaround time, on the average, will be 24 hours, the firm said.

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Burroughs, Memorex Grappling With Merger

By Robert Batt
CW West Coast Bureau

SANTA CLARA, Calif. — Burroughs Corp.'s acquisition of Memorex Corp. in a $115 million deal last fall began a process that is now having profound effects on both companies as they start to resolve policy questions concerning the organizational thrust of the new enterprise, its future strategy and management style.

There were many in the industry who doubted that such a merger could succeed. After all, Burroughs was in the process of a major management upheaval under new chairman Michael Blumenthal, while Memorex had posted losses for five straight quarters and was carrying a relatively huge debt of $240 million.

Now, nine months later, Burroughs looks in pretty good shape, posting second-quarter earnings of $36.5 million, a 16.5% increase over a year ago. "So far the merger seems to be proceeding without too much difficulty although there are longer term strategic questions still to be answered," said Steve Dube, analyst at the stockbrokerage firm of Dean, Witter and Reynolds in New York.

"Over the longer term," Dube commented, "through its association with Memorex, Burroughs has tied itself into the IBM plug-compatible market as well as needing to develop its own product base. This could present problems in terms of future product strategy."

Memorex officials admit that the cost of interfacing storage equipment (tapes and disks) from both companies and moving the Burroughs Peripheral Products Group into the Memorex product family is proving more costly than had been originally envisaged.

"The biggest short-term problem we have is in attaching existing Memorex devices to Burroughs systems as soon as possible," admitted Richard Martin, president of the Media Products Group at Memorex. "The difficulty is that the CPU architectures of Burroughs equipment and IBM products, with which Memorex products are traditionally designed to interface, are very different. The patterns of the characters on the respective disks are different and so the costs of interfacing these different types of thinking are very expensive," added Michael Haltom, vice-president of business development at Memorex.

Haltom said it is not easy for product planners within Burroughs and Memorex, trained in one set of engineering principles, to tap into an alternative methodology. Hence, the cost of interfacing was not fully appreciated until both sides got down to nitty-gritty details.

Joint Committee

To come to grips with these details, the companies set up a joint technical integration committee. The committee's job is to examine the development programs that are currently under way in both companies in the area of disk products and to decide which to continue to support and which to discontinue.

Some of the products, company officials said, overlap each other and so the committee must determine which products should be phased out and over what period of time.

For example, Burroughs, which had been pursuing a project designed to develop advanced disk drives, has dropped the idea in favor of the Memorex 3680 disk drive subsystem.

Prior to the merger, both Memorex and Burroughs were pursuing the thin film-head technology that the next generation of disk drives is expected to use. Memorex will now have sole responsibility for this effort in an attempt to prevent duplication of research and development expenditures. The subsidiary is now also believed to be developing an optical storage device that uses lasers rather than magnetic tape in an attempt to gain for the conglomerate a clear technological superiority in the market.

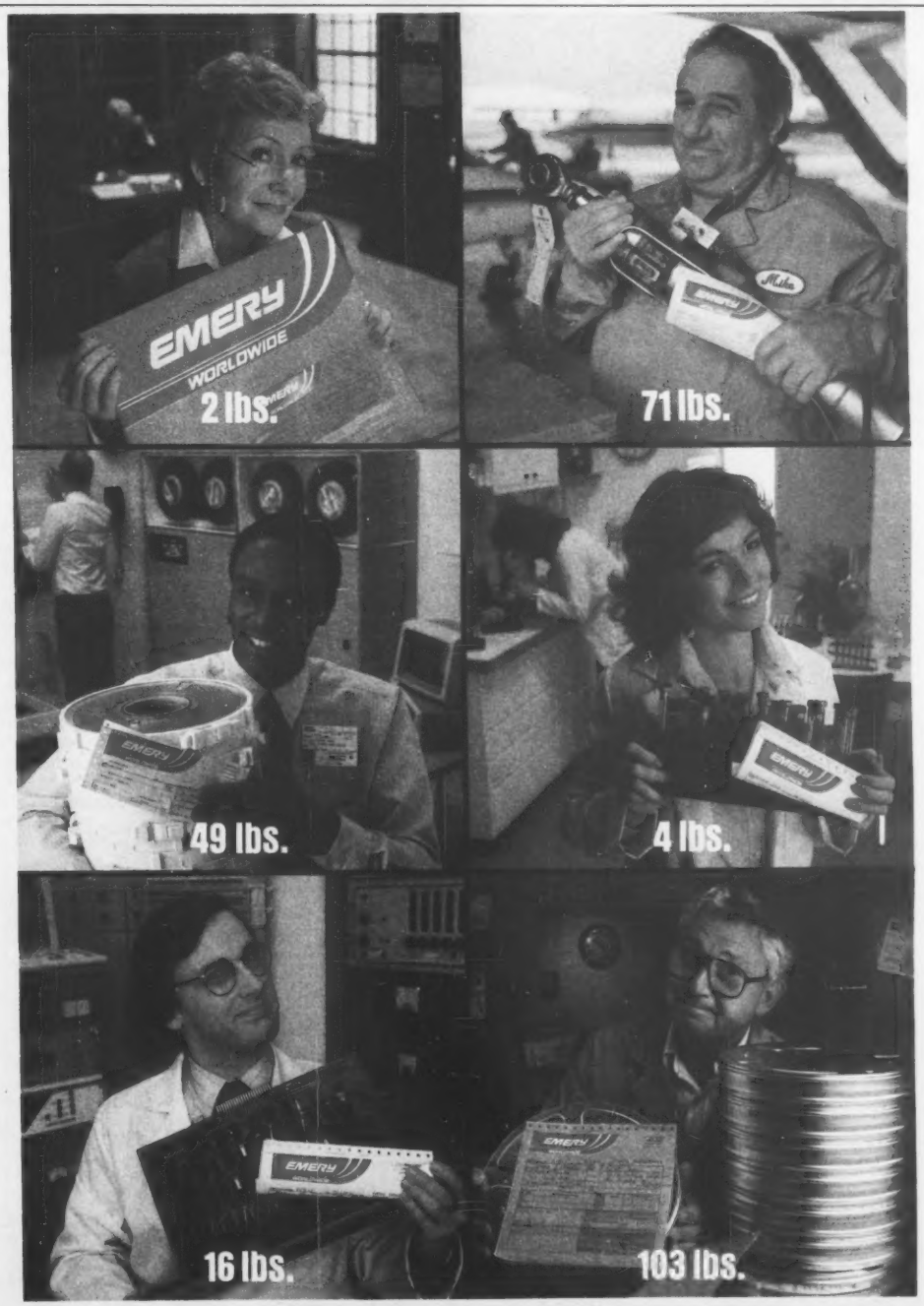
As a corollary of these developments, the committee is also in the middle of deciding which plants should produce what products — a process known as plant missioning. "We intend to really streamline our plants," Haltom said.

For example, both companies have now decided to concentrate development of very large-scale integration (VLSI) devices at Burroughs' Rancho Bernardo plant in California. In addition, the Westlake plant in Los Angeles has been chosen as the site for the development and production of advanced media disks.

These technical questions are, of course, a harbinger of a far more pronounced shift in corporate strategy on the part of Burroughs. With Blumenthal assuming the reins, the company has at last made the difficult decision to compete in the IBM plug-compatible field — an anathema to the previous management.

Management on both sides are convinced that with goodwill established on both sides, the merger is a natural fit and will work.

For both companies a lot is at stake. If they are right, the new formation could prove a powerful alliance in the computer industry in the '80s. If they are wrong, it could become known as one of the biggest mismatches of recent acquisition history.



Hitachi Not Delaying Supercomputer Debut

TOKYO, Japan — Hitachi Ltd. said it will unveil its HAP-1 supercomputer by the end of September. Earlier reports from Japan had indicated that Hitachi, whose mainframes are sold in the U.S. by National Advanced Systems, Inc., would put off the introduction because of its alleged involvement in the theft of trade secrets belonging to IBM [CW, June 28].

A spokesman for Hitachi said its supercomputer will compete against a recently announced Fujitsu Ltd. system, the VP-200.

Fujitsu claimed the VP-200 is 20% faster than Cray Research, Inc.'s top-of-the-line X-MP.

Bell to Enter the Micro Market

(Continued from Page 67)

Greggory Blundell, one of the report's authors. Today, there are 900,000 installed in U.S. offices, according to the study, and by 1992, it predicts there will be over 20 million. The reason for this rapid growth, according to Blundell, is that "of the office technologies we have assessed in the last three years, personal computers have been shown to contribute the strongest price-performance improvement in white-collar productivity."

Northern Telecom, Inc., and Tymnet, Inc. each currently offer a terminal that they call an "intelligent telephone," but, according to EMG, the successors to these products will put far more applications software in the hands of the white-collar user to provide "real processing power."

One reason PBX manufacturers are working hard to add personal computers to their product offerings, according to the study, is that "the PBX industry is growing less than 20% annually, while ... personal computers offer annual growth rates many times that size." The EMG predicted that by 1992, PBX vendors would be earning over $600 million annually from personal computer sales.

The present worldwide installed base of personal computers is 1,760,000 systems, of which 1,400,000 are in the U.S., according to the study. Approximately 65% of the U.S. installed base consists of business installations, 25% are in homes and 10% are in educational institutions.

Worldwide Sales

Worldwide sales of personal computers last year totaled $2.36 billion. Apple Computers, Inc. shipped 180,000 units, followed by Tandy Corp. with 165,000 and Commodore Business Machines, Inc. with 150,000.

By 1991, the EMG expects the installed personal computer base in the U.S. to reach 34.6 million systems. Of this total, 20.2 million are expected to be in business establishments, 10.9 million in homes and 3.46 million in schools.

Revenues from personal computer sales in the U.S., meanwhile, will jump from $3.06 billion this year to $15.65 billion in 1991, according to the study.

Another significant change, it said, will be a trend away from 8-bit microprocessors and operating systems toward 16-bit systems. "However, the great wealth of software oriented towards 8-bit systems will stimulate sales of 8-bit personal computers well into 1985." The four most popular applications of personal computers among business users, according to the study, are accounts receivable/billing, text editing, mailing-list maintenance and financial planning.

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Prime Reports 21% Increase In Latest Quarter's Earnings

NATICK, Mass. — Prime Computer, Inc. has reported a 20% increase in revenues and a 21% increase in earnings for its latest quarter. In addition, the company announced three new positions in its marketing and strategy group.

For the quarter, Prime's revenues totaled $105 million, up from $87.6 million in the year-ago quarter. Six-month revenues reached $208.2 million, up from $172.6 million reported for the first half of 1981.

Earnings totaled $10.9 million or 36 cents per share, up from earnings of just over $9 million or 30 cents per share in the like quarter a year ago. For the first half the company's earnings topped $21.5 million or 71 cents per share, up from $17.5 million or 58 cents per share for last year's first half.

At the same time the company beefed up its marketing and strategy organization. Prime named William C. Sadd to the newly created position of director of finance and administration for that group.

In addition, Michael D. Simon was named director of strategy. Simon will be responsible for key segments of the corporate strategy, market research and segmentation and strategic analysis, a duty previously handled by the corporate development department.

Gerald E. Rodts was named director of industry and office systems. In this newly created position Rodts will be responsible for international coordination, strategic planning and implementation of several key marketing programs including industry marketing, office automation systems and the recently announced software Solutions program.

All three directors will report to Harld F. Enright, vice-president of Prime Computer's marketing and strategy.

IBM Signs Mitel In PBX Pact

(Continued from Page 67)

vanced PBX machine.

Under the Federal Communications Commission's (FCC) Second Computer Inquiry Decision, Bell will be able to begin marketing this and other products on an unregulated basis as early as next January. The decision, however, may be overturned. It is being reviewed here by the U.S. Court of Appeals as the result of a suit brought by the Computer and Communications Industry Association among others.

Aside from saving time, another reason for buying outside PBX technology, consultant Lee Goeller indicated, is that there are already more than 20 digital PBX systems on the market, which might make it difficult for IBM to come up with a distinctive design. On the other hand, "IBM has a marketing/support organization second to none," he reported, and it could be an extremely effective competitive weapon once there was a product available to sell.

IBM developed a PBX machine in Europe several years ago, but it is based on obsolescent technology and hasn't sold very well. As a matter of fact, the reception has been so poor that last year, during IBM's antitrust trial, former IBM Chairman Vince Learson said "the machine in my judgement was a dud, always was a dud and still is a dud."

Goeller believes there is a good chance that IBM will add personal computing capability to whatever PBX system it develops as a result of the Mitel agreement. He also thinks Mitel, which has promised to incorporate a personal computer in its Superset VII "smart telephone" attachment to the SX-2000 PBX, may obtain at least part of the design from IBM.

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At Congressional Committee Hearing

CDC's Norris Calls for Public-Private Projects

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Control Data Corp. Chairman William C. Norris was in town recently pitching his well-known philosophy of private enterprise-government cooperation for urban development.

Norris described for the Congressional Joint Economic Committee various CDC projects that are part of the company's "primary business strategy of addressing major unmet needs of society, in cooperation with other sectors of society, as profitable business opportunities."

"It is clear," he said, "that traditional approaches which depend on government and private charity rather than private investment have not been adequate to meet the needs of our society." These needs, according to Norris, "are massive and therefore require massive resources far beyond those of any single sector in the society."

The CDC founder urged support for proposed legislation to provide direct financial assistance for infrastructural improvements and for comprehensive economic development planning and to encourage the cooperation of both public and private sectors.

Looking at the private sector side of the equation, Norris said many years of working "in the toughest of environments" have persuaded him that firms can develop financially successfull urban development projects if they are willing "to accept lower short-term returns on investment in favor of more substantial, long-term gains and to use, creatively, limited government support."

CDC Projects

He detailed several CDC projects to foster urban development, including the following:

- City Venture, a consortium of CDC, ten other firms and two church organizations, which plans and manages implementation of programs for the revitalization of urban communities.
- The company will soon have nine manufacturing plants in depressed areas. The existing seven plants employ more than 2,000 persons with annual payrolls totalling nearly $40 million, Norris said.
- Development of the company's Plato computer-based education system has progressed to the point that there are more than 100 CDC learning centers in this country.
- Five CDC business and technology centers, providing various combinations of consulting services, shared laboratory, manufacturing and office facilities to assist the start-up of small businesses.

Despite the ability of small companies to create jobs, "the environment for small business has been deteriorating because of increasing competition from large companies, increasing government regulation and decreasing availability of technology and capital," Norris noted.

These and other CDC projects show, he maintained, that "participation in public-private partnerships for urban development is good business . . . To expand such efforts, especially those creating jobs, we need government actions that will encourage broader participation by the private sector."

He praised the enterprise zone concept, advocating "a simple, straightforward approach which emphasizes incentives to stimulate the creation of small business within the zone.

"These would include," he said, "tax credits to encourage big companies to assist small business start-ups and provide them with technology, financing and management assistance and credits, too, which might encourage communities to convert closed schools into business and technology centers."

As to how to encourage such cooperative efforts, Norris said "tax incentives by themselves, however generous, cannot substitute for direct federal spending to improve infrastructures, clear and assemble land, train the unemployed and provide other basic services that neither the private sector nor local and state goverments alone can reasonably be expected to provide."

He added "it is essential that such direct government funding be leveraged by private funds." CDC experience has shown, he said, "that public funds, if effectively targeted, can lead to large private commitments."

In any urban development program job creation is "pivotal," he said. "Without jobs, meaningful and lasting urban economic and human development cannot occur."

Norris called for increased tax incentives for private sector cooperation in urban development. Without them, he said, "government will have to make large outlays for welfare and a continuing dependency on such expenditures." In the face of the Reagan administration's call for greater reliance on the private sector, Norris commented that "if government alone has not been able to do the job in the past, less government will be less adequate."

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Supershorts

GTE Satellite Corp. will begin construction in August on a satellite earth station in Chicago that will provide voice and data communications services to a four-city system connecting Chicago, Houston, Los Angeles and New York. The system, which operates in the 12 GHz to 14 GHz frequency band, will transmit data at speeds of 4.8K bit/sec, 9.6K bit/sec and 56K bit/sec. In 1984 the company plans to incorporate the initial service into a network capable of providing nationwide service.

Technology Finance Group, Inc., formerly Alanthus Corp., said it has settled claims of more than $10 million with Lloyd's of London. These claims arose out of the so-called "J" policies the insurance syndicate wrote to insure the residual values of IBM equipment on long-term leases.

Sears, Roebuck and Co. has opened a new Business Systems Center at 70 Federal St., Boston, which will sell and service a variety of electronic equipment under Sears and other brand names including IBM, Vector Graphics, Inc., Hewlett-Packard Co., Panasonic Systems, Inc. and Texas Instruments, Inc.

Avco Computer Services has acquired Multiplications, Inc.'s CICS application development system, Accolade, and will offer the system to its network of time-sharing customers.

For the first time, Tandy Corp. will sell a line of home computers through independent distributors and retailers as well as in their Radio Shack stores. The TDP System 100 will differ only in appearance and name from Radio Shack's TRS-80.

United Telecommunications Systems, Inc. has formed a subsidiary, Utelcom, to provide sales, installation and service of telecommunications business terminal products.

Automatic Data Processing, Inc. (ADP) has sold its commercial services operations in France to Societe General de Service et de Gestion for an undisclosed amount of cash and an ongoing royalty license for software being provided by ADP.

Mergers & Acquisitions

Genrad, Inc. has signed an agreement to sell its Futuredata Microprocessor Development Systems business to **Kontron, Inc.**, the U.S. subsidiary of **Kontron Elektronik GMBH** of Eching, W. Germany.

Adage, Inc. will acquire **Fulcrum Computer Group, Inc.** under an agreement that calls for the exchange of 205,000 shares of Adage common stock for all the approximately 14 million shares of outstanding Fulcrum Computer Group common stock. The agreement will be submitted to Fulcrum shareholders for final approval in late August.

General Electric Information Services Co., a subsidiary of the General Electric Co., announced plans to acquire Network Consultants, Inc., a Chicago-based banking software firm. GE Information Services will pay $3.5 million to acquire Network Consultants with an additional payment of up to $3.15 million based on company performance over the next year.

RCA Corp. has agreed to purchase **Cylix Communications Network** for more than $20 million. Cylix, headquartered in Memphis, Tenn., provides satellite data transmission services through a network of 30 earth stations. The network is currently owned by Data Communications Corp., Scripps-Howard Broadcasting Co., Storer Broadcasting and M/A-Com, Inc., each of which put up $5 million to fund the establishment of the network.

New Companies

Insurance Servicing & Information Systems Corp. is a firm specializing in insurance-servicing management; time-sharing services; software design, development and installation; and user training and documentation. More information is available from George A. Mann, Suite 302, 452 Hungerford Drive, Rockville, Md. 20850.

Oracle is a consulting group that assists organizations in vendor selection, project planning, system design and project management. The firm is located at 110 White Chapel Drive, Benicia, Calif. 94510.

Executive Corner

• George A. Mann has been appointed president of Insurance Servicing & Information Systems Corp.

• Richard A. Hahn has been named president and chief executive officer of IMJ & Associates, Inc.

• Burt H. Liebowitz has been named president of Contel Information Systems, Inc.'s Software and Systems Division.

• Ed Hughes, president and chief operating officer of Florida Data Corp., has been named the firm's chief executive officer.

• Leonard Jaffe has been named president of Computer Sciences Corp.'s Systems Division.

• Glenda B. Allen has been appointed treasurer of Magnuson Computer Systems, Inc.

• Bill Russell has been named vice-president/southwest region; Robert G. Romano, vice-president/eastern region; James G. Lightburn, vice-president/central region; and Robert J. Ponicsan, vice-president/southern region for Total Assets Protection, Inc.

• Rolf E. Westgard has been elected vice-president of 3M's Business Communication Products Division.

• Daniel M. Ulrey has been appointed vice-president of field operations for TSI International.

• Lee L. Franklin has been appointed vice-president of marketing for Southern Pacific Communications Co.

• W. Thomas Eley has been named vice-president, sales, for Manufacturing Data Systems, Inc.

• Glenn D. Hitchcock has been promoted to vice-president of general systems marketing for United Information Services, Inc., a business unit of the United Telecom Computer Group.

• Rowland Chew has been appointed vice-president of operations at Archive Corp.

• Harlan W. Snyder has been named vice-president of finance and Ernest J. Kochis has been named vice-president of manufacturing operations at Megatape Corp.

• Norman Lourie has joined Solvation, Inc. as vice-president of engineering and Roy A. Finney has joined the firm as vice-president of sales.

• Richard Palmer has been appointed executive vice-president and chief operating officer of International Software Enterprises, Inc.

• Donald A. Biggar has been named vice-president and general manager for eastern operations at System Development Corp.

• David V. Hardman has been named vice-president, engineering, for Ibex Computer Corp.

• Michael Thomas has joined United Data Corp. as national vice-president of marketing.

• Brendan G. Staveley has been appointed vice-president and general manager, Flexible Disk Media Division, of Memorex Corp.'s Media Products Group.

• Anthony E. Maurno has been appointed group vice-president, U.S. sales and service, for Software International Corp.

• Jim Smith has been named assistant vice-president for semiconductor marketing at Kierulff Electronics.

• William E. McDonald has been named president of Uninet, Inc., a United Telecom Communications company.

• H. Abelman has been named vice-president of sales and marketing for decision support systems of OR/MS Dialogue, Inc.

• Roland B. Davie has been named senior vice-president and general manager of the Service Support Division and James E. Beebe has been named vice-president and general manager of the Field Engineering Division at Telex Computer Products, Inc.

• Bruce E. Hamilton has been appointed vice-president of engineering at Megatek Corp.

• Don Valentine has been elected chairman of the board of Altos Computer Systems, Inc.

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Tymshare, Inc. has signed an agreement to provide comprehensive point-of-sales (POS) services for Barnett Banks of Florida, Inc., which Barnett in turn will provide to its merchant customers. Barnett will sell the POS services to merchants through its subsidiary, Verifications, Inc.

Cray Research, Inc. has been awarded a contract by the National Aeronautics and Space Administration for the installation of a Cray-1S/2200 computer system. The system is valued at approximately $11.5 million.

Control Data Corp. has received an order under a fixed-price contract amounting to $15,997,906 from the Commerce Department's National Oceanic and Atmospheric Administration for a Cyber 205 computer. The system will be used to help the National Weather Service meteorologists improve their forecasts.

BSL Technology has sold its first Clindata 72000 computerized medical laboratory communications system to the Harris County Hospital District, Houston, Texas. The contract is valued at $2.33 million.

Policy Management Systems Corp. has licensed the Continental Insurance Co., a subisidary of the Continental Corp., to use three of its software products. The contract, which includes initial and continued use charges, is in excess of $4 million.

Multiplications, Inc. has signed a $692,650 contract with the New York Metropolitan Transportation Authority (MTA) to develop and install the Centrak computer software system, which will be used to monitor and control the MTA's $7.2 billion capital improvement program.

Contracts & Pacts

North Star Computers, Inc. has signed a two-year contract, valued at $25 million to $30 million, with Avnet Corp. for the distribution of North Star's complete product line through Hamilton Micro Systems and Loonam Computer Products, divisions of Avnet Computer Marketing Group.

Cipher Data Products, Inc. will provide a full range of memory storage peripherals to Perkin-Elmer Corp. under the terms of a contract valued at $7.2 million.

Prime Computer, Inc. has signed a $10.5 million contract with the Mexican government to supply 32 Prime systems that will be used by the Secretariat de Educacion Publica to process the payroll for federal teachers in Mexico's 31 states.

Icot Corp. has signed an agreement with the Chase Manhattan Bank, N.A., to provide equipment including Icot's virtual terminal systems, protocol converters, communications processors and network gateway processors for the bank's data communications network over the next several years. Initial delivery will take place in 1982.

National Advanced Systems, a subsidiary of National Semiconductor Corp., has signed an agreement allowing it to market a complete line of distributed data processing equipment manufactured to its specification by Paradyne Corp.

Codex Corp. has signed a $1.4 million contract with Farmland Industries, Kansas City, Mo., for the purchase of Codex's minicomputer-based DNCS 400 network control and management system.

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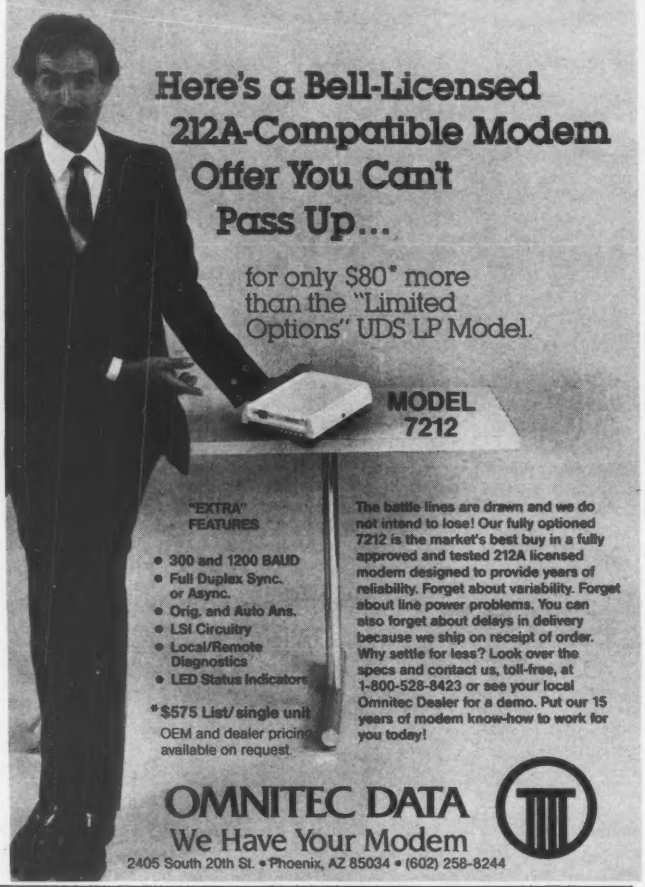
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(415) 328-4602
or call (800) 227-8365
from outside California,
Toll Free



DIRECT ACCESS TO JAPANESE COMPUTER TECHNOLOGY

Participate in a Technology Study Mission to Japan that will

- Meet with government ministries and trade associations
- Visit leading Japanese computer and semiconductor manufacturers
- Attend the Tokyo Data Show and Japan Electronic Show
- Identify opportunities for cooperation

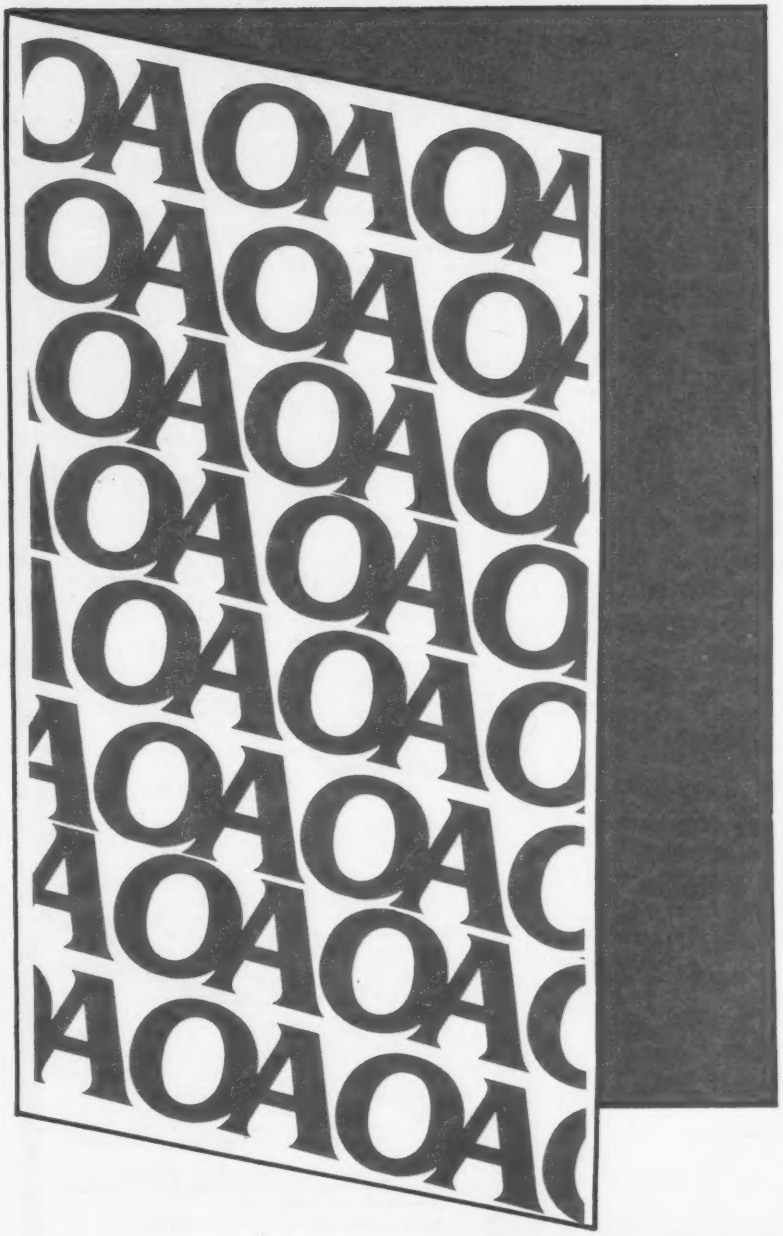
The study mission will take place October 16-31, 1982 and will be conducted jointly by two leading companies with extensive Japan-based staff. For further information on Study Mission scope and Itinerary please contact:

Nancy Dyer or **Neil Kleinman**
Technology Transfer Institute
250 West 34th St., Suite 1411
New York, NY 10119
(212) 947-2648

International Data Corp.
1448 15th St.
Santa Monica, CA
(213) 458-1681

Coming up in *Computerworld OA*

Selling Office Automation to Your Organization



The next issue of *Computerworld OA* will focus on selling office automation within an organization. This special report will feature the human angle of office automation and highlight the strategies of selling the concept of OA to top management and end-users in an organization. You'll see articles on implementation techniques, feasability studies, human interface, ergonomics and productivity.

And, of course, you'll see several articles on current happenings in all aspects of OA.

There will be bonus distribution of this issue to attendees of the Info '82 Show in New York this October. So, if you're a supplier of OA products and services, you won't want to miss the opportunity to advertise in *Computerworld OA's* next issue.

The issue date is September 29th. The deadline date to remember is August 20th for space reservations. (Materials are due August 27th.)

For more details on *Computerworld OA* and the people who read it, just contact your local *Computerworld* representative, or call Bob Ziegel, Vice President at (617) 879-0700 for all the information.

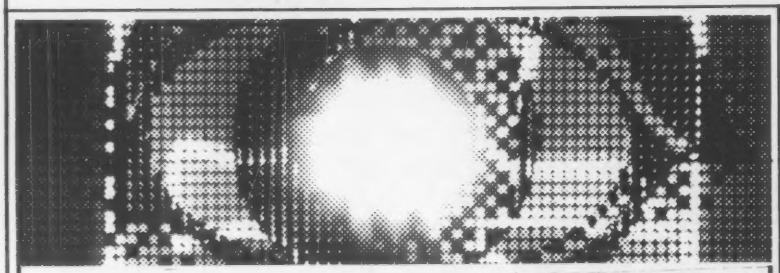
COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

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POSITION ANNOUNCEMENTS



Data Processing Professionals

Call us toll-free at:
1-800-821-7700, Ext. 603

At the Bank of America, we're looking for individuals with fresh, dynamic ideas that they would like to put to use. Present openings exist for:

IMS SYSTEMS PROGRAMMING PROFESSIONALS

Our Information Systems Technology Department has openings for individuals to work on projects to provide IMS based DB/DC systems for the bank's retail, corporate and administrative information processing. These openings — in both San Francisco and Los Angeles — will involve your working with some of the latest and most sophisticated hardware, software and data base/data communications applications. Using state-of-the-art products such as IMS/VS FASTPATH/MSC, ACF/VTAM, ACF/NCP and MSNF, you'll help set the direction for our team of IMS experts, in a high-performance IMS/MVS/SNA environment. If you're an IMS/VS Systems Programmer, Senior Level Technical Consultant or Manager, with at least 2 years' experience in one of the following areas, we'd like to hear from you.

- **Internal Support**
- **Consultation**
- **Release Installation**
- **Performance Analysis**
- **DB Installation**
- **DB Recovery**
- **Operations Training**
- **Troubleshooting**

CHIEF DESIGNER/IMPLEMENTATOR

In this position, you will be involved with our transmittal control project that is developing a new transmittal control system while maintaining the current system. The development effort is following a structured methodology, and to qualify, you must have extensive experience and expertise in those system analysis and development activities required for a complex on-line development effort. In your capacity as a work leader, you will be required to review and assist in managing a plan for the design, development, test and implementation of the new system. This is a highly visible position that provides an excellent opportunity for you to extend your professional knowledge and capabilities. Working with the latest IBM equipment, in both hardware and software implementation, your creativity will be fully utilized on this state-of-the art project. To qualify, you must have excellent verbal and written communication skills and the ability to make quality assessments of structured analysis, structured design, top down implementation, and code and testing. You should have real-time systems experience, data base management background, some Assembler, SNA/BHA, and an experience level of at least 7 years.

IMS Systems Programming Professionals and Chief Designer/Implementation resumes to Gwen Gomez, Management Recruitment Department 3442-GGC.

SYSTEMS ANALYSTS

Become a member of a winning team. Join Bank of America's Integrated Office Systems, a recognized leader in corporate-wide office automation.

You can realize your career potential with us as a member of our group of internal office automation consultants. Opportunities exist for various levels of experience. These positions incorporate responsibility for consulting and recommending automated systems for an exciting array of in-house user departments within this 85,000-employee company.

Required experience includes 2-6 years as a systems analyst in research, analysis, and design. At least one year of experience in office automation is required. Wang experience is highly desirable. Demonstrable interpersonal relations and marketing skills are a must.

Systems Analysts resumes to Mr. Jose Garay, Management Recruitment Department 3442-JGC.

We offer competitive salaries and benefits and the chance to advance your career with a world leader. Please call **AND** respond with resume, including salary history and requirements, to the appropriate person and department at: **Bank of America, P.O. Box 37000, San Francisco, CA 94137.** An equal opportunity employer.

Where vision becomes reality...

BANK OF AMERICA

SUPERVISOR PROCESS SIMULATION COLORADO

Tosco Corporation, a Fortune 500 leader of independent oil refineries has recently established a Corporate Technical Computer Center at its research facility in Golden, Colorado, just 15 miles from Denver. The computer operation will enhance Tosco's long term Corporate committment to refinery modernization, the latest in engineering and computer technology, and research and development for refining and synthetic fuels.

A leader is needed to manage the applications software group and to be responsible for refinery process simulation, engineering analysis, computer-aided design and computer based R&D projects Corporate wide. Candidates should hold an advanced degree in an Engineering/Scientific discipline (ChE preferred) with significant managerial and technical computing experience in the refining or chemical process industry. A background in research and DEC VAX 11/780 are desirable.

Tosco offers a competitive salary and benefit package, the opportunity for career growth, and a setting in the scenic foothills of the Rocky Mountains near both a dynamic city and abundant recreation.

Please send resume, including salary history to:

TOSCO CORPORATION
M. Gitt
18200 W. Hwy 72
Golden, CO 80401
NO AGENCIES PLEASE

An Equal Opportunity Employer M/F/H

ANALYST/ GROUP LEADER

Merrell Dow Pharmaceuticals, Inc., a world wide pharmaceutical company with headquarters in Cincinnati, Ohio, has an immediate opening for an Analyst/ Group Leader. We are seeking an experienced professional to add to its Management Informations Services Staff. You will have an opportunity to:

- **Work with state-of-the-art equipment -- IBM 4341 MVS,CICS, TSO with COBOL and DEC VAX 11/780 VMS with BASIC and ADABASE/M;**
- **Coordinate the activities of 3 Programmer Analysts;**
- **Interact extensively with users.**

If you have a Bachelor's Degree, knowledge of COBOL or BASIC, and 3 or more years experience in a commercial Data Processing environment, including user contact, we have an opportunity for you. We are looking for a self-starter to assume responsibility for all areas of project development and maintenance.

We offer a complete salary and extensive fringe benefits package.

Please send resume including salary history in confidence to:

Employment Manager
MERRELL DOW PHARMACEUTICALS
Subsidiary of The Dow Chemical Company
Cincinnati, Ohio 45215

Merrell Dow

DOW

NO AGENCIES PLEASE

Equal Opportunity Employer M/F

VAX INSTRUCTOR

TO: 38K

Our client, a major Route 128 electronics firm, seeks a Field Engineering Instructor with experience in the repair and maintenance of VAX hardware. Responsibilities include teaching FEs maintenance and repair procedures, and developing courses, training aids and instructor guides. Prior experience as a field engineer or instructor for VAX hardware is essential. For immediate consideration contact Rhonda Schuster, JUDGE ELECTRONICS SERVICES, INC., Suite 100, 2 Newton Executive Park, Newton Lower Falls, MA 02162. (617) 965-9700.

Judge

Client companies assume all fees.

UNIVERSITY OF HONG KONG LECTURESHIP IN COMPUTER STUDIES

Applications are invited for two posts of Lecturer in Computer Studies.

Candidates should have a higher degree in Computer Science. Preference will be given to applicants with experience or interest in Computer Systems Architecture, Computer Networks, Operating Systems, Performance Evaluation, Simulation, and Systems Analysts and Design. The Appointees will be required to Lecture as well as to participate actively in Research, and will be expected to assume duty in September, 1983.

Annual salary (superannuable) will be on an 11 point scale Hong Kong Dollars 129,840-217, 380 (US Dollars; HK Dollars 5.90).

Starting salary will depend on qualifications and experience.

At current rates, salaries tax will not exceed 15 per cent of gross income. Housing benefits at a rental of 7.5 per cent of salary, children's education allowances, leave and medical benefits are provided.

Further particulars and application forms may be obtained from the Association of Commonwealth Universities (Appts), 36 Gordon Square London WC1H OPF, England, or from the Appointments Unit, Secretary's Office, University of Hong Kong, Hong Kong. The closing date for applications is 24 September 1982.

ARAMCO SERVICES COMPANY IN HOUSTON

DATA PROCESSING PROFESSIONALS

Enjoy living and working in the heart of the Sun Belt.

When Aramco Services Company in Houston hires you as a data processing professional, you'll gain experience that you probably could not duplicate anywhere. And you'll live in one of the fastest growing metropolitan areas in the country.

Phenomenal overseas operations depend on Houston people

Aramco is the key company involved in the development of the energy resources of Saudi Arabia. We need more computer professionals in Houston to support these vast overseas operations which are continually expanding.

In Saudi Arabia, Aramco is involved in dozens of incredibly large and complex projects. Probably nowhere else in the world is modern technology being employed so widely. Aramco Services Company in Houston plays a significant role in all of it.

If you have a BS or a BA in Computer Science, Math, Business, or a related field and a minimum of two years of data processing experience in a large IBM environment (3033, OS/MVS, JES2), we have the following openings now in Houston:

Systems Programmers

We are looking for several systems programmers with varying levels of experience ranging from a two-year programmer to an eight-year working supervisor. Experience in some or all of the following areas/skills is required: MVS/SE or SP1 internals, JES2, NJE, VSAM, IMS, TSO command language, SAS graphics, and support of IBM and non-IBM products. All positions have high visibility and user contact.

Data Base Analysts and Support Analysts

You must have a minimum of 2 years' experience in IMS system support including use of BTS, IMS utilities, DB performance and tuning tools—IMSPARS, IMSASAP, DB and DC monitors, etc.

Commercial Programmers

Your primary duties will include development and maintenance of software to support purchasing, shipping and financial activities of the company.

Required are 2 years of DP experience; PL1, OS/MVS, JES2, structured techniques experience; and experience with projects involving treasury, industrial relations, and payroll.

We also need commercial programmers with 3 years' experience and familiarity with PL1, TSO, IMS, DB/DC, OS utilities, and MARK IV/SAS.

Commercial Analysts/Programmers

You must have at least 3 years' experience in design, analysis and programming of commercial application systems, and at least 2 years' experience in IMS, on-line DB/DC and PL1. ADF or MARK IV experience is required as well.

Standards and Procedures Analysts

You must have at least 3 years' experience in data processing including systems analysis and technical writing. Experience with IBM TSO/SPF and SCRIPT/VS is necessary. Candidates will conduct search and analysis to insure quality and consistency of documentation and will assist project teams in developing standard procedures and guidelines. Individuals may also interface with user groups in a quality assurance role.

Engineering Support Analysts

Systems analysts are needed with 7 years' experience. Project management experience is preferable. Knowledge of higher programming languages, in particular MCAUTO's Management Control Software (MSCS, COPES, TMAPS, MAPS, and LISS), is needed. Analysts will work with engineering clients defining project requirements, designing systems, and implementing systems. Analysts will also work with project management teams to define reporting requirements.

Excellent compensation and benefits

When you work for Aramco Services Company, you'll receive an excellent compensation, benefits and relocation package, work in a pleasant environment, and have the additional advantage of paid parking or a company-subsidized van pool.

Interested? Call our 24-hour line any day: (713) 750-6965 or send your résumé to Aramco Services Company, F3061-2, P.O. Box 4534, Houston, Texas 77210.

ARAMCO SERVICES COMPANY

SUMMERTIME IN NEW ENGLAND

CAPE COD, THE WHITE MOUNTAINS, NEWPORT, TANGLEWOOD, THE BERKSHIRES, MYSTIC SEAPORT and much more. See it all as you investigate our client base of the finest Manufacturing, Insurance, High Technology, Banking and Service clients with openings at every level including:

PROJECT LEADERS . . . . . To 38K
SYSTEMS PROGRAMMERS . . . . . To 40K
SYSTEMS ANALYSTS . . . . . To 35K
PROGRAMMER ANALYSTS . . . . . To 32K
SOFTWARE ENGINEERS . . . . . To 45K

And if New England's not your cup of tea, we offer openings across the country through our affiliation with National Personnel Consultants (NPC). Naturally companies pay all fees, interview and relocation expenses.

Send resume or call A.J. Rachele toll free: **1-800-628-3374.** In Massachusetts call (collect) **413-781-0982.**

MEMBER npc 130 affiliates coast-to-coast

dp Specialists
DYNAMIC PERSONNEL SYSTEM
P.O. Box 539
West Springfield, MA 01090

Member Technical Staff

A research and development division of a major U.S. corporation has an immediate need for a Software Development Engineer to help develop an advanced local digital switching system--a pioneering project that will bring involvement with the latest technology.

The job function consists of functional, detail design, implementation and testing of the software for a processor interface controller, using a PDP 11/34 computer. This individual will be responsible for the design and development of performance monitoring tools on PDP 11/34 and VAX 11/780 for a lab test facility network. This person will be involved with the design and development of the software to control the data analyzer as well as the software for a document cataloging system.

The person we seek must have a minimum of a Masters degree in Computer Science. In addition, this person must have a good working knowledge of the following: 1) knowledge of operating systems; 2) knowledge of computer hardware and digital electronics; 3) mini/macro computer systems; 4) IBM VM, CMS; 5) DEC PDP-11 macro II, INTEL assembler; 7) IEEE-488 RLS.

Salary--$26,100

Send your resume to Connecticut State Job Service Technical Unit, Connecticut Department of Labor, Hartford, CT 06115. Please refer to Job Order #216238.

An Equal Opportunity Employer, M/F

MIS CAREER OPPORTUNITIES

Join a professional Management Information Service Department with challenging growth opportunities for career oriented individuals. We are seeking professionals with skills relative to the following positions:

DATA BASE ADMINISTRATOR

- Extensive Analysis and File Design
- Development of Standards and Procedures
- Access Techniques
- Working Knowledge of Internals (ADABAS a +)
- COBOL
- 3 Years Experience

SYSTEMS PROGRAMMER (Technical Services)

- MVS System Generation, Maintenance and Internals
- Teleprocessing
- Development of Standards and Procedures
- 2 Years Experience

We are offering a competitive salary and an excellent benefit package.

Please forward resume and salary requirements for confidential consideration to:

Frank Pottoroff
Personnel Department
Mayflower Corporation
P.O. Box 107-B
Indianapolis, IN 46206
Phone: (317) 875-1170

An Equal Opportunity Employer

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Data Processing Consultant

Armco Insurance Group, a major national multi-line insurance group has created a challenging opportunity due to a recent reorganization. This position will:

- Prepare studies and coordinate the development and design of EDP systems.
- Manage external and internal resources used by the total group to assure meeting objectives on a cost-effective manner.
- Conduct research functions to determine alternatives and recommendations for EDP systems.

The successful candidate must have strong experience in EDP systems development/management with primary emphasis on financial applications, a variety of consulting assignments with a multi-division company, excellent working knowledge of IBM mid-size hardware and software, some exposure to micro computer applications, and strong interpersonal communications skills. The ideal individual will have an MBA with emphasis in MIS or the financial area.

We offer an excellent compensation and benefits package, relocation assistance, profit sharing, thrift savings, dental, and comprehensive Health/Life insurance coverage. For confidential consideration, please send resume with salary history to:

Scott Krienke
Armco Insurance Group
731 N. Jackson St.
P.O. Box 2070
Milwaukee, WI 53201

An Equal Opportunity Employer M/F

ARMCO INSURANCE GROUP

MANAGER - DATA PROCESSING

New position for Samson Resources Company and subsidiaries, a rapidly growing company, active in oil and gas exploration, production and property acquisitions. Individual's responsibilities will be total management of data processing department to include supervision of a staff of 5, systems application/design, scheduling and purchasing of hardware and scheduling of monthly operations. Ideal candidate will have a minimum of 3 years oil and gas experience including system design and analysis, working knowledge of RPG II or III, experience with IBM S/3, S/34, or S/38 computers, and good interpersonal skills. Excellent salary and a comprehensive benefit package including bonuses and investment opportunities are available to qualified individuals. If interested in this growth opportunity send resume (including salary history) in confidence to:

Personnel Department
Samson Resources Company
2700 First National Tower
Tulsa, Oklahoma 74103

No Agency Referrals

Samson Resources Company

Equal Opportunity Employer, M/F

STATE UNIVERSITY OF NEW YORK COLLEGE at OLD WESTBURY
COMPUTER FACULTY POSITIONS

COMPUTER AND INFORMATION SCIENCES: Two tenure-track faculty positions in a baccalaureate program offering concentrations in Systems Software, Information Systems and Systems Analysis. Research and instructional computing facilities include a Burroughs B6810 mainframe and a VAX/830 running under UNIX. Candidates should have broad training in one or more of the following areas: **Translators, Operating Systems, Computer Networks, Systems Programming, Computer Architecture, and Distributed Processing.** Minimum requirements: M.S. in computer science or related field; and appropriate experience in industry or college teaching. Ph.D. desirable. Rank and salary dependent on qualifications. Candidates are expected to participate in curriculum articulation and coordination of CIS offerings with other college programs. Starting date: February, 1983, or September, 1983. Deadline for applications: August 20, 1982.

Send resume and names of four professional references to:

Director of Affirmative Action
Search Committee CIS
State University of New York
College at Old Westbury
Old Westbury, NY 11568

Affirmative Action/Equal Opportunity Employer

SENIOR PROGRAMMER ANALYST

State agency responsible for community development, low-income housing,and fuel assistance seeks Programmer/Analyst with two-three years experience in COBOL or FORTRAN to develop and maintain diverse systems typical of business and government. Position offers advantage of working with a small computer group on a variety of tasks during a period of intensive systems develoment.
Ideal candidate will have knowledge of mini-computers, particularly PRIME's operating system, to use effectively the agency's PRIME 550 System. Should have sufficient experience with FORTRAN to maintain on-going systems and access PRIMOS subroutines but may develop new programs in either COBOL or FORTRAN. Knowledge of FORTRAN 77, FORMS, and POWER would be an asset.

Salary: Starting at $21,800/yr.

Send resume to:

EXEC. OFF. COMM. & DEVELOP.
PERSONNEL OFFICE, DEPT. 22C
100 Cambridge St.
Boston,Ma. 02202

Affirmative action equal opportunity employer

SENIOR SYSTEMS PROGRAMMER/ ANALYST

Is it time to move up? Take the lead with a dynamic, growth-oriented EDP services org.

Challenging positions available for bright, energetic prog./analyst with 4+ yrs. data processing exp., supv. exp. & coll. degree to develop manual procedures & control mechanisms to operate major system, prepare estimates & schedules, train & supv. programming staff, design & implement systems & research studies.

We offer comprehensive co. paid benefit pkg inc. relocation expense, exc. salary & state-of-the-art equipment. Please send resume in confidence to:

Ms. Jeanette
Personnel Mgr.
THE COMPUTER COMPANY
8225 Florida Blvd.
Baton Rouge, LA 70806

EOE M/F/H/V

DALLAS

SAUDI ARABIA

Have several positions available. These include mgmt, systems analysis, legal/contract admin., training, data base, software and communications. Benefits outstanding. Start date flexible. Salary open.

PARS/ACP

Assignments available in Europe. Need several yrs. expr. in ACP or applications.
TO: $45,000

CONTACT: John Staiger

ROBERT HALF OF DALLAS, INC (214)363-3300
Two NorthPark East Suite #750
Dallas, Texas 75231

SUNBELT

D.P. Professionals needed for our client companies in SE - SW. All Fees paid. Send resumes or call collect:

ANN BARKER
3401 West End Bldg., Suite 310
Nashville, Tennessee 37203
(615)-292-0931

DEALY ROURKE PERSONNEL

Director of Computing

The State University of New York Stony Brook

The Director has primary responsiblity for planning, directing, and adminstering the Computing Center and for guiding and implementing the continuing design and use of a campus-wide computer network. The University is now in the process of changing from a largo central computing facility to a distributed network of computers.

Candidates should have an earned docotorate from an accredited academic institution, or have demonstrated an equivalent level of expertise, and should have an established reputation in computer sciences or in computer applications in another field. Candidates should have extensive administrative experience in a computing environment responsible for providing computing services to a diverse group of research, educational, and administrative users.

Salary negotiable depending upon qualifications and experience.

Send letter of application, resume, and the names of at least three references by August 31, 1982, to: Dr. J.R. Schubel, Chair, Search Committee for Director of Computing, SUNY Stony Brook, PO Box 599, Stony Brook, NY 11790.

SUNY Stony Brook is an equal opportunity/affirmative action employer. AK #407C.

State University of New York Stony Brook

Data Processing

RETAIL DP MANAGER

Venture Stores, approaching $700 million dollars in sales, is the largest and youngest division of The May Department Stores Company. Data Processing is playing a key role in our growth plans within the following environment: • Twin 370/158's • OS/MVS • On-line communications network linking all stores • Major CICS development in progress • Data Base development underway • Two remote Tandem computers.

Expansion has created an exceptional opportunity for a seasoned DP Executive with the following credentials to take charge of all store systems and distributed processing projects reporting to the Vice-President, DP: • 10 15 years' managing large complex projects • significant experience designing POS and merchandising systems • communications and data base experience highly desirable.

In addition to a whale of an opportunity, we are a solid company located in a delightful suburb of St. Louis offering an excellent pay and benefits package. Please call our DP Director collect or forward your resume in confidence to:

Personnel Director
VENTURE STORES, INC.
A Division of The May Department Stores Company
(314) 344-2681
615 Northwest Plaza
St. Ann, Missouri 63074
Equal Opportunity Employer M/F

Venture

Member Technical Staff

A research and development division of a major U.S. corporation has an immediate need for a Software Development Engineer to help develop an advanced local digital switching system--a pioneering project that will bring involvement with the latest technology.

The job function consists of design, implementation and testing of computer software for use in a custom design distributed-processor telephone switching system. It requires implementation of telephony principles as well as computing principles such as distributed architecture and computer Input/Output systems. This individual will also be responsible for design reviews conducted through the testing phase. Involvement with custom software development support systems will be required through usage of preprocessors and compilers. Module testing will require high level language simulation. The integration testing phase of the job will require the usage of INTEL software development products. Testing i this environment requires the use of multiple MDS machines to track and control message communications among multiple processors.

The person we seek must have a minimum of a Masters degree in Computer Science. In addition, this person must have a good working knowledge of the following: 1) distributed computer architecture 2) finite state machine concepts; 3) high level programming languages; 4) INTEL 8086 Assembler language, MDS, ISIS, CREDIT and ICE 86; 5) DEC VAX system.

Salary--$26,060

Send your resume to Connecticut State Job Service Technical Unit, Connecticut Department of Labor, Wethersfield, CT 06109. Please refer to Job Order #222582.

An Equal Opportunity Employer, M/F

Telecommunications Consultant

Our Bay Area client has an excellent opportunity for a Telecommunications Consultant. Duties will include: repair of transmission facilities; dealing with outside vendors; determining electrical and communications requirements for new sites.

The successful candidate should possess the following background:

- Working knowledge of VTAM, IMS, NCCF & NPDA, TSO HASP, RJE & SPF
- Exp. in problem determination
- Strong oral and written communication skills

Company offers competitive salary and excellent benefits package. We are consultants to management. For immediate and confidential consideration, please send your resume to:

Consultant (Dept. C-82)
Reply to CW-A3299
Computerworld
Box 850
Framingham, MA 01701

Employer assumes fees

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

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IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
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COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

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SOFTWARE CULLINANE

QUIETLY REVOLUTIONIZING SOFTWARE.

The first to introduce three levels of integrated software: database, applications and graphics. The first computer software products company to be listed on the New York Stock Exchange (CUL). The most financially successful computer software company in the country. Growing at a rate of 54% per year, when the industry average stands at 30%. **Cullinane Database Systems, Inc.** is fast becoming synonymous with Software. Shouldn't you find out why?

Applications Software Development

Requires senior level (minimum 3-5 years) experience in design, development and implementation of financial (general ledger, A/P, A/R, etc.) or manufacturing applications. Database background essential. Project leadership experience desirable. Good communication skills and ability to work independently.

Database Software Sales Representatives

Excellent opportunities for sales representatives who can demonstrate a successful track record in vendor software sales or have a strong background in data processing/database management with IBM or compatible equipment.

Systems Software Development

Requires creative, highly motivated professionals with extensive background in systems programming or control systems software development. Results-oriented, customer responsive environment. Development openings are within the following groups:

- **Database**
- **Data Communications**
- **Integrated Data Dictionary**
- **On-Line Query**
- **Audit-Retrieval**
- **Application Development System**

Product Marketing Managers

- **Database Products**
- **Financial Systems**
- **Manufacturing Systems**

Exceptional opportunities are available for individuals who possess a high degree of technical expertise and the ability to communicate systems concepts to prospective users and our own field sales organization. Qualified candidates should possess excellent presentation skills and be able to develop multi-media presentations and various sales support tools. A full degree and some marketing exposure helpful.

For prompt, confidential consideration, please forward resume, specifying position of interest, to Roy Evarts, Employment Manager, Dept. 82CW, **Cullinane Database Systems, Inc.**, 400 Blue Hill Drive, Westwood, MA 02090.

C Database Systems
Cullinane

An Equal Opportunity Employer

REGIONAL MANAGEMENT LEGAL CONSULTING

Leading information management company in the field of LITIGATION SUPPORT seeks aggressive individual for its West Coast operations based in Los Angeles.

We want a person who desires a position with full responsibility for regional sales, account management, preparation of marketing plans and budgets. This position reports directly to the Corporate Vice President and offers substantial rewards.

Candidates should have a law degree and a proven track record of sales in Professional Services and ability to communicate both verbally and in writing.

Excellent starting salary plus the best incentive compensation program in the industry.

To apply, please send resume and salary requirements to:
Richard I. Isacoff, Esq.
Director of Personnel

Aspen Systems Corporation
1600 Research Boulevard
Rockville, MD 20850

All inquiries strictly confidential.
Equal Opportunity Employer M/F/H/V

SENIOR PROGRAMMER ANALYST

One of the largest, most successful direct mail organizations in the country is designing and developing an entire new software system for an on-line data base environment. We have an opening for a senior person.

The successful applicant will have a minimum of five years actual experience in the analysis, design, programming and documenting of commercial business applications using both ALC and COBOL. A working knowledge of ADR's Datacom DB/DC is required as is experience in direct mail.

Our company is located in the Washington, DC Metro area with immediate access to the beltway and has a wide range of benefits including a generous leave policy, medical/dental plan, and company sponsored activities.

If you meet the qualifications, please submit your resume in complete confidence. We are an equal opportunity employer and will respond to all applications within three days of receipt of your correspondence.

Please send resume to:
The Viguerie Company
7777 Leesburg Pike
Falls Church, VA 22043
ATTN: Charles Gardner

SYSTEMS PROGRAMMERS
SUB-CONTRACTING SALARIED POSITIONS AVAILABLE

Long or Short Term Contracts With Challenging Technical Environments In Florida, New Jersey or New York

If you are a Systems Programmer who has internals experience with any of the following: OS/MVS, DOS/VS, IMS or CICS or VTAM, then we can offer you a chance to make a significant jump in your income. For immediate consideration please call (collect):

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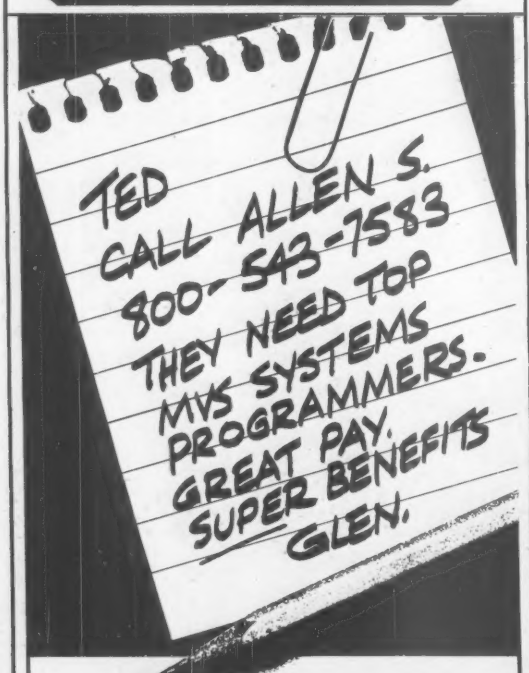
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Systems Programmers

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ADVANCED APPLICATIONS PROGRAMMING TRAINERS must have an in-depth background in COBOl and debugging. We would definitely prefer knowledge of OS/MVS concepts, JCL, Assembler, Structured Design Methodology and Command Level CICS or IMS DB/DC.
SYSTEMS PROGRAMMING TRAINERS must be proficient in Assembler with a working knowledge of OS/MVS internals, JCL, debugging, and IMS DB/DC. Knowledge of CICS and SNA strongly preferred.
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Plan, implement, and be a major part of our total operations. You'll deal with outside vendors and manage overall direction of the department, including input/output control, on-going maintenance of applications, technical support, and problem management.

Prior management experience and at least 10 years in a sophisticated computer environment is required. Experience with an IBM 4300 or 3030 CPUs operating under DOS/VSE with an on-line CICS and IMS or IDMS data base is vital. You must also demonstrate creativity and an ability to communicate with all levels of personnel. Problem-solving abilities are also essential. A college degree in Computer Science is desirable. (Dept CW 7).

TECHNICAL SUPPORT MANAGER

You'll install and handle on-going maintenance of systems programs, solve technical problems, and be responsible for communications lines and equipment control.

Previous management experience in technical support with at least 7 years technical background is required. Prior experience in support for an IBM 4300 or 3030 CPUs under OS/MVS with CICS, VTAM and NCP is necessary. You'll need a background dealing with systems software vendors, strong communications skills, and an ability to problem-solve and risk manage for the on-line mode of data processing. A college degree in Computer Science is also necessary. (Dept. CW 5).

DATA BASE ADMINISTRATOR

Responsibilities include installation and on-going maintenance of Data Base Management System (IDMS/DB), monitoring and tuning Data Base, developing procedures, documentation, and establishing overall standards. You'll also interface with vendors, train technical staff members, and assist in the design and implementation of new systems.

Prior experience in Data Base Administration and at least 3 years under IDMS/DB is required. An ability to develop standards and design both logical and physical is also essential. A Computer Science degree required. (Dept CW 4).

COMMUNICATION SPECIALIST

You'll be responsible for the installation and on-going maintenance of VTAM and NCP, as well as the control of communication lines and equipment.

At least 3 years in a technical support role of VTAM and NCP is essential. You'll also need a proven ability for installing and maintaining the above. (Dept. CW 3)

ASSISTANT TO APPLICATION PROGRAM MAINTENANCE MANAGER

Responsibilities include quality control of programs and JCL, as well as troubleshooting for problems caused by misoperation, down machines, JCL errors, and program errors. You'll also help train junior programmers.

At least 5 years experience in programming and a minimum of 1 year in machine operations is necessary. Familiarity with COBOL, RPG-II and CICS, plus JCL skills for an IBM DOS/VSE is also required. A college degree preferred. (Dept. CW 1).

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The position offers excellent salary and benefits commensurate with experience. Please send SALARY HISTORY and RESUME to:

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A working knowledge of data processing systems, operating software, and programming languages is required as is the ability to react with technicians and faculty. Centralized MIS operation experience is desirable. Salary range: $25,000-$28,000. Application deadline: August 12, 1982. Send resume and letter of application only to: **Administrative Search Commitee, Greater New Haven State Technical College, 222 Maple Ave., North Haven, CT 06473.**
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DATA COMMUNICATIONS SUPERVISOR

Bachelors degree and three years related work experience or equivalent with one year supervisory experience. Salary lower 20's.

The closing date for the positions is extended until August 30, 1982. Send resume to: **Personnel Officer, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. Phone (304) 293-5192. AN EQUAL OPPORTUNITY EMPLOYER**

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If we're the type of company you are looking for and your experience is from a similar environment, please consider these openings:

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Responsible for daily monitoring of system-wide performance of an MVS/SP1 installation in a multiple CPU shared DASD environment. Additionally, responsible for development and establishment of procedures in this newly defined functional area. Should have extensive experience using performance tools such as real time monitoring and SAS programming. Strong analytical and statistical background preferred plus applicable experience in what-if software modeling.

Please mail resume and salary history to Employee Relations department. Principals only.

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Programmers/ Systems Analysts

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Or Call (312)541-2130

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San Francisco

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We are consultants to management. For confidential consideration, please send resume and salary history to:

Consultant (Dept. C-82)
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Computerworld
Box 880
Framingham, MA 01701
Employer assumes fees

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GMI Engineering & Management Institute is seeking a highly motivated individual as a Systems Programmer to install, maintain and support systems software and on-line facilities in an IBM 3031 VM/CMS environment. Candidates must have in-depth knowledge of ASSEMBLER, OS JCL, VM/CMS and should possess good communications and interpersonal skills. Four years experience required. If you desire a challenging position in a progressive educational environment and can do creative, independent work with minimal supervision, send your resume to: **Ms. Pamela Loving, Personnel Director, GMI Engineering & Management Institute, 1700 West 3rd Ave., Flint, Michigan 48502.**

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The job function consists of analysis of the functions of the preprocessor which supports the programming language and data base control system. The individual will also be responsible for top level and detailed design of the above support software, utilizing modern algebra, programming language and relational data base theories in design and PL/1, Fortran and Assembly languages in coding. This person will also be responsible for measurement and analysis of the performance of high level language in the digital switching system based on INTEL 8080 series.

The person we seek must have a minimum of a Master's degree in Computer Science/Math. In addition, this person must have a good working knowledge of the following: 1) advanced software development tools; 2) high level programming languages; 3) knowledge of the development of hardware and software of microporcessor 8080 series; 4) knowledge of Relational Data Base system; 5) in-depth knowledge of mathmatical and statistical theories and applications.

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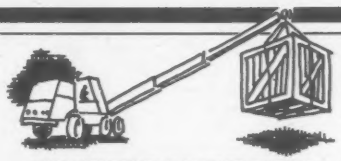
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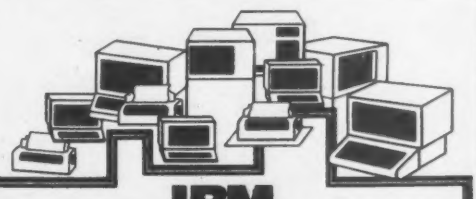
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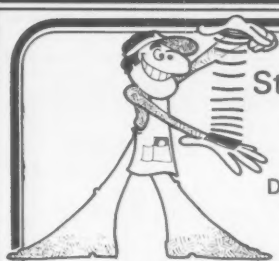
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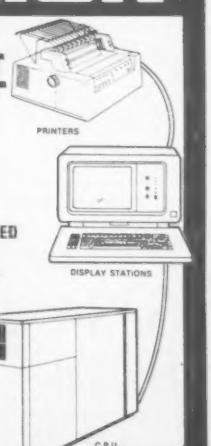
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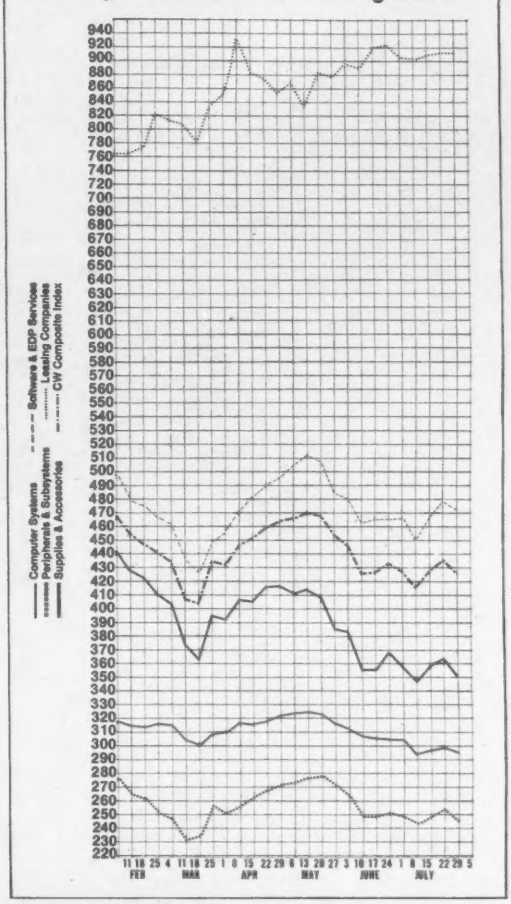
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Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, JULY 28, 1982

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

E X C H		1981-82 RANGE (1)	CLOSE JUL 28 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	18- 46	19 7/8	- 1/2	-2.4
N	BURROUGHS CORP	28- 72	32 3/8	- 1/4	-0.7
O	COMPUTER AUTOMATION	8- 28	8 3/4	- 3/8	-4.1
N	CONTROL DATA CORP	18- 42	25	-1	-3.8
N	CRAY RESEARCH INC	20- 48	23 1/8	-2	-7.9
N	DATA GENERAL CORP	24- 87	24 3/8	-1 1/2	-5.7
N	DATAPOINT CORP	11- 68	13 5/8	- 1/4	-1.8
N	DIGITAL EQUIPMENT	85-113	85 1/8	-2 7/8	-4.2
A	EECO INC	6- 18	7 3/8	- 1/8	-1.6
N	ELECTRONIC ASSOC.	5- 13	8 1/8	- 1/4	-2.9
N	FLOATING POINT SYST	13- 30	18 3/4	0	0.0
N	FOXBORO	25- 62	26 1/2	-2 1/2	-8.6
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 16	3 1/2	0	0.0
N	HARRIS CORP	21- 80	26 1/2	- 1/8	-0.4
N	HEWLETT-PACKARD CO	33- 94	42 3/4	-3 3/4	-8.0
N	HONEYWELL INC	83-115	87 7/8	+ 3/8	+0.5
N	IBM	48- 73	84 7/8	-2 5/8	-3.8
O	IPL SYSTEMS INC	6- 13	6	- 1/4	-4.0
O	MAGNUSON COMP SYSTS	2- 32	1 3/4	- 1/4	-12.5
N	MANAGEMENT ASSIST	8- 26	8 1/4	- 3/4	-7.5
O	MINI-COMPUTER SYST	0- 4	3/8	+	+18.8
N	MODULAR COMPUTER SYS	7- 32	7	- 3/8	-5.0
N	MOHAWK DATA SCI	10- 32	12 7/8	+ 1/8	+0.9
N	NCR	39- 76	52 1/4	+ 3/4	+1.4
N	PERKIN-ELMER	18- 36	18 3/8	-1 3/4	-8.6
N	PRIME COMPUTER INC	16- 48	17	- 5/8	-3.5
N	SPERRY CORP	21- 65	21 1/8	-1 7/8	-8.1
O	TANDEM COMPUTERS INC	13- 35	16 3/4	-2	-10.6
N	TEXAS INSTRUMENTS	71-151	88 1/8	-3 3/4	-4.0
A	WANG LABS.	22- 48	23 1/2	-2	-7.8
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	18- 28	22 1/2	0	0.0
N	COMDISCO INC	16- 27	18 3/8	-1 1/2	-7.5
B	COMMERCE GROUP CORP	1- 1	5/8	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	3/8	0	0.0
O	CONTINENTAL INFO SYS	4- 8	7 3/4	+ 1/4	+3.3
N	DFF INC	5- 13	8 1/4	- 1/8	-1.4
O	ITEL	1- 5	5/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 30	23 5/8	+1 3/8	+6.1

E X C H		1981-82 RANGE (1)	CLOSE JUL 28 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 3/4	+ 1/8	+7.6
O	ADVANCED SYSTEMS INC	10- 15	11 1/2	- 1/4	-2.1
O	AGS COMPUTERS INC	7- 10	8	- 1/4	-3.0
O	ANACOMP INC	10- 18	12 1/2	+ 1/8	+1.0
O	ANALYSTS INTL CORP	3- 14	6	0	0.0
A	APPLIED DATA RES.	13- 25	21 3/4	- 1/8	-0.5
O	ASK COMPUTER SYSTEMS	11- 17	16 1/8	+ 1/4	+1.3
B	ASTRADYNE COMP IND	1- 5	1 1/4	0	0.0
N	AUTOMATIC DATA PROC	22- 32	23	-1 1/2	-6.1
O.	CGA COMPUTER ASSOC	4- 25	6 1/4	- 1/4	-3.8
O	COMPUTER ASSOC INT'L	12- 20	18 1/4	+ 1/4	+1.3
O	COMPUTER HORIZONS	1- 3	2 1/2	+ 1/4	+11.1
O	COMPUTER NETWORK	4- 9	5 7/8	- 5/8	-9.6
N	COMPUTER SCIENCES	11- 30	13	0	0.0
O	COMPUTER TASK GROUP	10- 23	11	-2 1/2	-18.5
O	COMPUTER USAGE	2- 10	2 5/8	0	0.0
O	CONSERV CORP	8- 16	12 3/4	- 1/4	-1.9
O	COMSHARE	6- 21	6 1/2	- 1/8	-1.8
N	CULLINANE DATABASE	15- 37	27 5/8	-3 1/4	-10.5
O	CYCARE SYSTEMS INC	8- 14	10 3/4	0	0.0
O	DATA DIMENSIONS INC	1- 3	3/8	0	0.0
O	DATATAB	1- 4	1/2	0	0.0
O	DYATRON CORP	2- 11	2 7/8	0	0.0
N	ELECTRONIC DATA SYST	15- 30	28 1/2	- 1/2	-1.8
O	INFORMATICS INC	10- 23	11 7/8	- 3/8	-3.0
O	INSYTE CORP	1- 3	2 1/2	- 1/8	-4.7
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 8	4 1/4	+ 1/4	+8.2
A	LOGICON	12- 38	14 1/8	-1 5/8	-10.3
O	MNGT SCI AMER INC	17- 26	20 3/4	- 1/2	-2.3
O	MATHEMATICA INC	8- 17	14	0	0.0
O	MATHEMATICAL APP GRP	14- 28	15	-2	-11.7
O	NATIONAL DATA CORP	13- 28	14 3/4	- 1/8	-0.8
O	PANSOPHIC SYSTEMS	8- 15	10 3/4	- 1/4	-2.2
N	PLANNING RESEARCH	5- 13	7	+ 1/8	+1.8
O	PROGRAMMING & SYS	1- 2	1 1/2	+	+4.3
O	REYNOLDS & REYNOLD	16- 28	20 1/2	- 1/2	-2.3
O	SEI CORP	17- 28	21 1/4	-2	-8.6
O	SHARED MEDICAL SYST	26- 37	30 3/4	- 1/2	-1.5
O	STSC INC	8- 28	9 3/4	- 1/8	-1.2
O	SCIENTIFIC COMPUTERS	6- 16	6 7/8	+ 1/8	+1.8
O	SOFTWARE AG	5- 23	6 1/8	- 1/4	-3.9
N	TYMSHARE INC	13- 58	18 7/8	+1 7/8	+12.5
A	URS CORP	10- 18	10 1/8	- 1/4	-2.4
N	HYLY CORP	7- 20	10 1/4	+ 1/8	+1.2
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	1- 15	1 1/8	+	+5.5
A	ANDERSON JACOBSON	8- 26	8 1/8	- 1/8	-1.3
O	AUTO-TROL TECHNOLOGY	8- 62	12 1/4	- 1/4	-2.0
O	BANCTEC INC	7- 35	7 3/4	- 3/4	-8.8
O	BEEHIVE INT'L	6- 18	5 1/2	- 1/2	-8.3
A	BOLT,BERANEK & NEW	9- 25	14 7/8	- 1/2	-3.2
O	CAMBEX CORP	2- 8	1 7/8	0	0.0
N	CENTRONICS DATA COMP	7- 40	8	- 7/8	-9.8
A	CETEC CORP	4- 8	4 3/8	0	0.0
O	COGNITRONICS	2- 11	3 3/4	- 1/8	-3.2
O	COMPUTER COMMUN.	1- 2	1/2	0	0.0

E X C H		1981-82 RANGE (1)	CLOSE JUL 28 1982	WEEK NET CHNGE	WEEK PCT CHNGE
A	COMPUTER CONSOLES	16- 28	20	-1 1/8	-5.3
O	COMPUTER DEVICES INC	4- 10	9 3/4	+ 1/4	+2.6
O	COMPUTER TRANSCEIVER	3- 8	4 3/4	- 1/4	-5.0
N	COMPUTERVISION CORP	20- 49	22 1/8	-2 3/8	-9.6
N	COMRAC CORP	17- 28	23 1/2	- 1/8	-0.5
A	DATA ACCESS SYSTEMS	2- 15	1 1/2	0	0.0
A	DATAPRODUCTS CORP	16- 44	18	-1 1/4	-6.4
O	DATARAM CORP	4- 15	7 5/8	+ 3/4	+10.9
O	DATUM INC	2- 5	2 1/8	0	0.0
O	DAVID JAMISON CARLYL	3- 7	3 1/4	- 5/8	-16.1
O	DECISION DATA COMPUT	3- 6	5	+ 1/4	+5.2
O	DELTA DATA SYSTEMS	1- 4	1 3/8	- 1/8	-8.3
N	ELECTRONIC M & M	3- 8	4	- 3/4	-15.7
O	EVANS & SUTHERLAND	18- 40	20 3/4	-2 1/2	-10.7
N	GEN'L DATA COMM IND	7- 18	8 5/8	- 3/8	-3.7
O	GENERAL TERMINAL CP	0- 4	3/8	0	0.0
O	GREAT SOUTHWEST IND	1- 12	3 3/4	0	0.0
N	HAZELTINE CORP	19- 35	27	+ 1/8	+0.4
O	INFORMATION INTL INC	8- 17	12 1/2	+1	+8.6
O	INTEL CORP	21- 51	32 3/4	- 3/4	-2.2
O	IPL SYSTEMS INC	5- 15	8	- 1/4	-4.0
A	LUNDY ELECTRONICS	7- 18	10 1/8	- 5/8	-5.8
A	MSI DATA CORP	11- 27	15 1/8	+ 1/8	+0.8
O	NETWORK SYSTEMS CORP	14- 25	18 3/8	- 3/8	-2.0
O	OMEX	3- 8	3 1/2	0	0.0
N	PARADYNE CORP	25- 52	28	-3 3/4	-11.8
A	PENRIL CORP	7- 17	8 1/2	- 1/2	-5.5
O	RANTEK CORP	8- 23	15 3/4	+ 1/4	+1.6
N	RECOGNITION EQUIP	4- 21	4 1/2	0	0.0
O	SCAN DATA	1- 5	1 1/4	0	0.0
N	STORAGE TECHNOLOGY	17- 40	17 3/8	-2 5/8	-13.1
O	SYKES DATATRONICS	8- 34	13 1/4	0	0.0
A	T BAR INC	7- 19	8	+ 3/8	+4.8
A	TEC INC	4- 11	10 1/4	0	0.0
N	TEKTRONIX INC	43- 70	44 1/4	-8 3/4	-18.0
N	TELEX	5- 10	9	0	0.0
O	TESDATA SYSTEMS CP	3- 17	3 1/8	0	0.0
A	TIMEPLEX INC	7- 18	8	+ 1/4	+2.8
O	VISUAL TECHNOLOGY	10- 15	10 3/4	- 3/4	-6.5
O	WILTEK INC	1- 3	1	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 17	12 3/4	0	0.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	14- 24	15 1/2	0	0.0
O	CYBERNATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	18	+ 1/8	+0.8
N	ENNIS BUS. FORMS	15- 23	18 3/8	- 7/8	-4.3
N	3M COMPANY	48- 85	53 1/2	-2 7/8	-3.0
O	MOORE CORP LTD	26- 38	29 1/2	- 3/8	-1.2
N	NASHUA CORP	9- 33	8 7/8	-1 1/4	-12.3
O	STANDARD REGISTER	30- 43	42 1/2	+3 1/4	+8.2
A	TAB PRODUCTS CO	13- 30	13 1/2	- 1/8	-0.8
N	WALLACE BUS FORMS	22- 36	30	- 3/4	-2.4

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At MSA, we specialize in ready-to-install applications systems designed to solve real-world problems—now and into the future.

We offer a complete line of financial, cash management, human resource, and manufacturing applications. And the *total software support* to keep those systems up-to-date.

Here are six important areas where the right software—and The Software Company—can help.

1. Meeting the demand for management information

For many DP shops, backlogged requests for management reports can cause delays and decrease productivity.

MSA applications provide user-friendly reporting features that can often solve this problem.

With MSA systems, accountants and financial managers can produce reports without tying up data processing personnel.

The Custom Reporting feature of the MSA General Ledger System gives accounting people complete control of financial reporting functions. With this feature, they're able to design, build, and produce their own reports. Quickly, and without programmer assistance.

Online capabilities such as EASY-SCREEN™ and EASY-AUDIT™ let accountants design their own screens. Other MSA products give end-users direct access to powerful forecasting and modeling capabilities.

MSA applications help free your data processing staff from routine reporting functions. And increase your overall productivity.

2. The search for integrated systems

MSA is the only software supplier that offers a complete line of integrated business applications.

System interfaces are provided for all MSA applications. These pathways automatically channel information between systems.

By combining MSA systems, you dramatically reduce manual entry operations. And redundant data storage is eliminated.

Most importantly, your integrated MSA applications function interactively to support high-level decision-making.

3. Keeping software up-to-date

Software maintenance costs can amount to more than fifty percent of your total data processing budget.

But with your MSA application package, you get a full year of support services *at no charge.* (After that, you can take advantage of our surprisingly affordable support options).

Our customer support organization is the largest in the industry.

We keep track of government regulations, accounting and personnel procedures, and new data processing techniques.

And when new developments affect your system, we provide update bulletins promptly.

We also respond to customer needs and suggestions with timely enhancements and new releases for your system.

At MSA, we keep you *and* your systems up-to-date.

4. Training your people

The MSA Customer Education Program is the most thorough in the industry.

In 1982, for example, we are conducting more than 90,000 student-hours of training.

A broad selection of courses are available, ranging from advanced training for data processing personnel to basic system orientation for end-users.

Workbooks and audio cassettes are also available for on-site training.

5. Reducing implementation time

MSA Implementation Teams have installed more than 7400 software systems worldwide. And we put that experience to work for you beginning with the very first meeting.

We help you work out an implementation schedule that tells you what will happen, when it will happen, and who will be responsible.

Your system is installed by specialists who are experienced with the type of computer hardware your company uses. And they work with you until the system is installed, tested, and operating smoothly.

We even help you handle important details like new business forms, including new check stock, invoices, and so on.

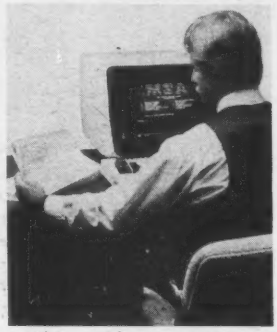
6. What about microcomputers?

For many office productivity and business applications, microcomputers are a practical adjunct to mainframe computing.

Through our Peachtree Software™ Division, MSA can help you co-ordinate your organization's microcomputer software requirements.

You can choose from a full line of comprehensive, yet easy-to-use business applications.

Peachtree's office productivity



MSA systems let accountants generate their own financial reports.

software products offer an impressive array of functions that include: electronic mail, spreadsheet analysis, word processing, and even a system that checks your spelling.

Talk to The Software Company

We'd like to tell you more about how our systems can give you ready-to-install solutions.

For more information on MSA systems, please contact Robert Carpenter at (404) 239-2000. Or clip this coupon.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

Please send me free, detailed information on MSA, The Software Company. I'm particularly interested in:

Mainframe Applications Software: ☐ Financial Systems, ☐ Cash Management Systems, ☐ Human Resource Systems, ☐ Manufacturing Control Systems (MRP II)

Microcomputer Software: ☐ Office Productivity Systems, ☐ Business Application Systems

Computer Type/Model_____

Name_____

Title_____

Company_____

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City_____

State_____ Zip_____

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